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THE

VOYAGE OF H.M.S. CHALLENGER.

BOTANY—VOL. I.

REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1873-76

UNDER THE COMMAND OF

CAPTAIN GEORGE S. NARES, R.N., F.R.S.

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

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AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

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By William Botting Hemsley, A.L.S.

(*Received March* 25, 1885.)

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By William Botting Hemsley, A.L.S.

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EDITORIAL NOTES.

This volume contains Parts I., II., and III. of the Botanical Series of Reports on the Scientific Results of the Expedition, together with a General Introduction to these Three Parts dealing with the present state of knowledge of various Insular Floras.

Botanical notes for the guidance of the Naturalists of the Expedition were prepared at the Royal Gardens, Kew, previous to the departure of the Challenger, and were incorporated in the instructions drawn up by the Circumnavigation Committee of the Royal Society.[1]

The botanical collections of the Expedition referred to in this volume were made by Mr H. N. Moseley during the cruise, and despatched direct to the Royal Gardens, Kew, from various ports touched at by the Expedition. Preliminary notices of these collections, and notes by Mr Moseley on the general aspects of the vegetation of many of the places visited, were from time to time published in the Journal of the Linnean Society.[2]

The Continental botanical collections made during the voyage being very fragmentary, it was determined to limit these Reports to a review of the Insular Floras which came within the range of the Expedition, combining for this purpose the materials already in existence at the Royal Gardens, Kew, and at the British Museum, with the new facts brought to light by the Challenger collections.

The task of preparing these Reports dealing with the Insular Floras was, on the recommendation of Sir Joseph D. Hooker, K.C.S.I., C.B., F.R.S., intrusted to Mr William Botting Hemsley, A.L.S., who writes—

"When asked whether I would undertake to report on the Botany of the Challenger Expedition, the report to be restricted to Insular Floras, I unhesitatingly replied in the affirmative, because I felt assured of the friendly assistance not only of the botanists at Kew and the British Museum, but also of various specialists in cryptogamic botany. In

[1] Narr. Chall. Exp., vol. i., 1885, p. 27 *et seq.*

[2] For a list of these publications see Narr. Chall. Exp., Bibliography, Appendix VI. pp. 1053–1063.

this I was not mistaken; and it is now a pleasant duty to record my obligations and convey my thanks to those gentlemen to whom I am indebted for giving me the benefit of their experience, and thereby adding greatly to the value of my work. From long association with Sir Joseph Hooker in botanical work I had become, through his influence, particularly interested in the study of Insular Floras—an interest first awakened when I had the advantage of examining with him, now more than twenty years ago, a large number of New Zealand plants in connection with his Handbook of the Flora; but it was only as I advanced with my present work that I more fully realised the difficulties of the task before me, and the impossibility, notwithstanding that I was receiving so much help from others, of my being able to accomplish it in a manner wholly satisfactory to myself. As I proceeded, facts accumulated to an unexpected extent, and the number of questions and issues involved increased at every step. At first I was rather inclined to speculations; but I soon became aware that a careful collection of facts, and a conscientious examination of the evidence upon which certain theories and statements connected with Insular Floras had been founded, would be of more value than a speculative treatment of the subject. Imbued with this idea, I have to a great extent left the facts to speak for themselves; yet, without attempting a final solution of the many problems which I encountered, I have not altogether abstained from expressing my own opinions, nor from pointing out what appeared to me the correct deductions from the facts adduced. This change in the method of treatment will explain any little inequalities in the work, because the first part was printed before the writing of the second was finished, and the second was printed before the writing of the third was begun, while the Introduction was mainly written after the whole of the other was in type.

"Due acknowledgment has been made in the proper places of information extracted from published works and unpublished documents, as well as to contributors of dried plants from the various islands, so that it only remains for me to mention those who have afforded me active help—help which has saved me from many a pitfall, and largely compensated for my own inexperience in some branches of botany, and for which I am glad of this opportunity of expressing my sincere thanks.

"The work was intrusted to me under the superintendence of Sir Joseph Hooker, and I am under special obligations to him for his guidance, for placing at my disposition all his notes and references relating to Insular Floras, and also for reading the proofs as they issued from the press. I had hoped that he himself would write the Introduction, but his multifarious duties rendered it impracticable. Professor Oliver's aid I cannot overestimate, for he has throughout permitted me to consult him upon points of detail as they arose, and as we were usually working in the same room I have profited by it on numberless occasions. Mr W. T. Thiselton Dyer, who has taken the greatest interest in the work from the beginning, has also read the proofs and assisted me in many ways, more especially in searching out interesting facts bearing upon my subject from the voluminous official

correspondence at Kew. Mr J. G. Baker has given me direct help in drawing up the lists of ferns; Mr Mitten in mosses and liverworts; the Rev. J. M. Crombie in lichens, and Dr M. C. Cooke in fungi; and these gentlemen, together with the Rev. M. J. Berkeley, Dr Nylander, the late Professor G. Dickie, and Dr Reinsch, have between them named all the cryptogams. In some instances I have ventured to add references to descriptions, and to give some of the more important synonyms, as well as the distribution of the species; but I have been careful to discriminate between their work and my own in order that they should not suffer from any errors into which I may have fallen. As mentioned elsewhere, Mr Carruthers and Mr Britten spared themselves no trouble in searching through the earlier collections at the British Museum, especially the Sloane Herbarium, for plants coming within the scope of my work; and I may add that more use might have been made of the British Museum collections of Polynesian plants, but as I had to deal with such a very small fragment of the Flora (Admiralty Islands only) it was not thought necessary, especially as Seemann enumerates, in his Flora Vitiensis, all the species he met with in the British Museum Herbarium. His work, however, is in a measure supplemented by a number of unpublished lists of comparatively recent collections of insular plants at Kew, partly in the general Introduction, and partly in the Report on the Botany of the South-eastern Moluccas.

"Finally, it gives me much pleasure to mention that Miss Matilda Smith has taken great pains with the drawings made from dried plants, and especially with the dissections of the flowers.

"With regard to the details nothing more need be said here, as everything is explained that seemed to require explanation in the body of the work. I may repeat, however, that full references are given in only one place for such plants as occur in more than one of the florulas contained in each part of the Reports."

The dates at which the manuscript of the Reports was received by me are stated after the titles in the contents of the volume.

Conte Abate Francesco Castracane is at present engaged in the preparation of a report on the DIATOMACEÆ collected at the surface of the ocean and procured from the deep sea deposits. This report will form Part IV. of the Botanical Series. A fifth Part, on the other pelagic algæ of the open ocean, will complete the series.

JOHN MURRAY.

CHALLENGER OFFICE, 32 QUEEN STREET,
EDINBURGH, 1*st June* 1885.

THE

VOYAGE OF H.M.S. CHALLENGER.

BOTANY.

REPORT on PRESENT STATE of KNOWLEDGE of various INSULAR FLORAS, being an Introduction to the Botany of the Challenger Expedition. By WILLIAM BOTTING HEMSLEY, A.L.S.

PRELIMINARY REMARKS.

IN the Introductory Notes on the vegetation of the various islands included in the Reports on the Botany of the Expedition, are embodied tables showing the distribution of the genera and species of each island or group of islands. There are also observations on the composition, affinities, &c., of the different insular floras, together with references to the diverse agencies operating in the dispersal of plants, whilst numerous facts and suggestions bearing upon the same subject are scattered throughout the lists. Finally, the Appendix to the third Part of the Botany is devoted to the record of evidence of the part played by oceanic currents and birds in the transport of seeds from place to place.

This General Introduction is not limited to a mere summary of the facts contained in the Reports, and speculations thereon; it has been so extended as to form an epitome of the Botany of a large number of Oceanic Islands, and of the Antarctic Regions generally. The special characteristics of Insular Vegetation in various parts of the world are set forth and compared with continental vegetation; and, as a whole, the work may perhaps serve as an indication to travellers of the nature and extent of the observations required for the advancement of this most interesting subject.

LITERATURE RELATING TO INSULAR FLORAS.

A list of works devoted to, or bearing upon this subject, is given at the end of this Introduction; but it seems desirable to say a few words respecting the teachings of a few travellers and authors who have specially investigated or promoted the philosophical

investigation of Insular Floras and Faunas. Although there are references in the writings of botanists of the last half of the eighteenth century, and of the first half of the present century, to some of the peculiar features of Insular Floras and Faunas, it is only within the last fifty years, or thereabouts, that their composition and origin have been the object of particular study.

Darwin, C.—The works of Darwin are so widely read that it seems almost superfluous to enter into any details here respecting their nature and scope. His Journal of Researches, and Origin of Species, abound in facts and suggestions relating to the distribution of plants and animals. It was he who first recognised, or at least thoroughly investigated, the means of transoceanic migration; and it is to him that we are so largely indebted for directing the thinking and observing powers of the present generation of naturalists in the proper channels for obtaining true knowledge. He also conducted a number of experiments to ascertain the capability of certain seeds to bear immersion in salt water without injury, and made various investigations showing how seeds are conveyed by birds in their feet and beaks, and in their stomachs. In short, he practically laid the foundation of the inquiry into the means and modes by which remote islands became stocked with plants and animals.

Hooker, Sir J. D.—The first work of importance by this author is his Essay on the Vegetation of the Galapagos Archipelago, concerning the botany of which nothing was previously known. Two-thirds of the species enumerated were new to science, and so distinct in character as to afford materials for the foundation of a new branch of botanical inquiry in relation to the means by which the seeds of plants are conveyed long distances, and their species thereby diffused. It is perhaps the first work on Insular Floras of a philosophical character, and the forerunner of and guide to subsequent literature on the same subject. The seeds and seed-vessels of the various plants are described, and their capabilities for transport by various means indicated; and the affinities and origin of the Flora fully discussed.

The Botany of the Antarctic Voyage contains much relating to Insular Floras, and more especially that part of it entitled the Antarctic Flora, which embodies all that was known forty years ago concerning the flora of a portion of the region to which the islands from the Tristan da Cunha group to the Macdonald group belong. The first part consists of the Flora of Lord Auckland and Campbell Islands, and the second deals with Fuegia, the Falklands, and the Tristan da Cunha group, and other islands eastward to Kerguelen Island. Previously, nothing of importance had been published on the botany of this region; and subsequently the same author has published various other papers relating thereto, for which we refer to the bibliography at p. 81. The Introductory Essay on the Australian Flora in the Flora Tasmaniæ—a work of immense labour, executed at a time

when at least a third of the plants had not been described, and the existing literature was very much scattered, has been the basis of all subsequent inquiries in the same direction, and later discoveries go towards completing the pictures there outlined. The section devoted to the consideration of the Antarctic or Alpine element of the Australian Flora is of special interest in connection with the present work.

The only other work by Sir Joseph Hooker demanding notice in this place is the Lecture on Insular Floras delivered by him before the British Association in 1866. In this the general features of the vegetation of remote oceanic islands are explained, and the special characteristics and affinities of the floras of various islands and groups described. Commencing with the Madeiran group, the author continues with the Canaries, Azores, St Helena, Ascension, concluding with Kerguelen Island. He then proceeds to discuss the hypotheses that have been invented by naturalists to account for the presence of continental plants in oceanic islands, and for those various differences between insular and continental Floras previously indicated.

Watson, H. C.—The author of the Cybele Britannica, and other works on the distribution of British plants, was so great an originator in this special branch of study that his name will endure as long as phytogeography is cultivated. Not the least among the merits of his works is the careful classification of British plants, based upon their claims to be regarded as aboriginally native, and upon the extent to which assumed naturalised species had established themselves. He was the first, we believe, to distinguish fully the introduced from the indigenous element of a flora; and the first to recognise the different "types of distribution" represented in the vegetation of a country.

Forbes, E.—Although this writer's contributions to the literature of phytogeography are, like Watson's, limited almost exclusively to British plants, his theories are of general application. His essay on the Geological Relations of the Fauna and Flora of the British Isles was the forerunner of all speculations on the migration of plants in relation to geological changes.

De Candolle, A.—The Geographie Botanique Raisonnée is a work remarkable for the skilful co-ordination of a vast array of facts, and the logical precision of the arguments; but so little was known of Insular Floras at that date that it was impossible for the author to enlarge upon the subject. A chapter (p. 1278) is devoted to the question whether islands possess a smaller number of species on the same area than continents, which is substantially answered in the affirmative, save for such as are most favourably situated.

Wallace, A. R.—In his Island Life, Wallace specially deals with the distribution and the origin of the plants and animals inhabiting islands. He classifies islands according to their "two distinct modes of origin," continental and oceanic. The latter he assumes hav

never formed part of a continent or any large mass of land, and bases his arguments concerning the origin of their plants and animals thereon. Their volcanic or coralline formation, with the exception of the Seychelles,[1] New Caledonia, and New Zealand, and the total absence of indigenous mammalia and amphibia, are accepted as proof of their having always been isolated.

The following extract contains his definitions of continental islands :—

"Recent continental islands are always situated on submerged banks, connecting them with a continent, and the depth of the intervening sea rarely exceeds 100 fathoms. They resemble the continent in their geological structure, while their animal and vegetable productions are either almost identical with those of the continent, or if otherwise, the difference consists in the presence of closely allied species of the same types, with occasionally a very few peculiar genera. They possess in fact all the characteristics of a portion of the continent, separated from it at a recent geological period.

"Ancient continental islands differ greatly from the preceding in many respects. They are not united to the adjacent continent by a shallow bank, but are usually separated from it by a depth of sea of a thousand fathoms or upwards. In geological structure they agree generally with the more recent islands; like them they possess mammalia and amphibia, usually in considerable abundance, as well as other classes of animals; but these are highly peculiar, almost all being distinct species, and many forming distinct and peculiar genera or families. They are also well characterised by the fragmentary nature of their fauna, many of the most characteristic continental orders or families being quite unrepresented, while some of their animals are allied, not to such forms as inhabit the adjacent continent, but to others found only in remote parts of the world. This very remarkable set of characters marks off the islands which exhibit them as a distinct class, which often present the greatest anomalies and most difficult problems to the student of distribution."

The zoological characteristics of these three classes of islands are often associated with parallel botanical peculiarities; but, owing to the more numerous and potent agencies operating in the distribution of plants, their peculiarities are usually very much less pronounced.

In illustration of his classification, Wallace examines and discusses the composition of the faunas, and less fully of the floras, of the Oceanic Azores, Bermudas, Galapagos, St Helena, and Sandwich Islands; of the Recent Continental Islands, Great Britain, Borneo, Java, Japan, and Formosa; and of the Ancient Continental, the Madagascar group; while the Celebes and New Zealand are treated as Anomalous Islands, because their plants and animals exhibit a blending of those characteristic of "oceanic" and "continental" islands.

The more complete botanical researches for the present work have brought to light some additional facts confirming generally the views enunciated by Darwin, Hooker, and Wallace, and more fully set forth by Wallace in the book under consideration. There is, however, one important exception. All Wallace's speculations on former land connections

[1] Eruptive rocks have been discovered in these islands. See Velain, Mission de l'Ile de St Paul, pp. 440–450.

are based upon the present relative depths of the intervening seas, and, while admitting, or rather suggesting, a former connection between New Zealand and Eastern Australia, he utterly rejects Captain Hutton's theory of a southern continent uniting the former with South America, and perhaps also with South Africa. Without going so far as Hutton, we think the botanical evidence, as explained further on, strongly favours a former greater land connection in a lower latitude in the south temperate zone than Wallace admits, and we cling to this "forlorn hope of the botanical geographer," as Sir Joseph Hooker terms it; for all the various means by which plants are diffused seem to be inadequate to account for the present distribution of plants in the coldest southern zone of vegetation.

Seemann, B.—This author merits special mention here for the immense amount of information concerning the vegetation of Polynesia he embodied in his Flora Vitiensis. How much it contains is only apparent on a thorough examination of the work, for he gives no summary nor tabular view of the distribution of the vegetation. He utilised the collections made by the early voyagers, as well as various unpublished documents relating thereto, in the British Museum.

Grisebach, A. H. R.—The chapter on Oceanic Islands in Die Vegetation der Erde (and especially as supplemented in the French edition of Tchihatchef) is doubtless the best general account in existence of the botany and geology (the latter only in the French edition) of oceanic islands; but there are a great many blanks in the floral statistics, a number of which are more or less filled by the present work; and these insular floras are considered by Grisebach apart from all continental floras.

Moseley, H. N.—Independently of the collections of dried plants, the drift-seeds and seed-vessels, and the seeds from the crops of pigeons, Mr Moseley has in various publications recorded the observation of a large number of facts bearing on plant geography, which add much to the value of the Reports on the Botany of the Expedition.

CLASSIFICATION OF ISLANDS IN RELATION TO THE COMPOSITION OF THEIR VEGETATION.

The classification of islands proposed by Wallace, whose definitions are reproduced on the preceding page, harmonises on the whole very well with differences in the characteristic features of the vegetation of some islands; but it is not adapted for exhibiting the floral peculiarities of islands generally—because, apart from latitude, the sources of the vegetation of oceanic islands, for example, are obviously so various that a classification based on age and the degree of isolation alone is inapplicable. A glance at the composition of the vegetation of the Bermudas and the Galapagos is sufficient to show that these two groups

of islands cannot be placed in the same category. Relative age, however, which, after all, is the fundamental principle of Wallace's classification, is in a measure indicated by the nature of the flora; yet we have no such striking voids in the floras of oceanic islands generally as that caused in the faunas by the absence of land-mammalia and amphibia. The indigenous vegetation[1] of oceanic islands presents physiognomical rather than structural characteristics, but even such peculiarities are repeated in continental situations; therefore insular vegetation of the most ancient type cannot be said to possess any absolute peculiarities. Certain forms predominate, governed by physical conditions, but, as is more fully explained in succeeding paragraphs, counterparts, or even exaggerations of them, occur on continents. In short, all the characteristic features of insular floras are reproduced elsewhere, except the invariable poverty in species in relation to area; and as this is not due to the same causes operating in continental desert tracks, the cases are not parallel. The general characters of remote insular floras are: relatively large ordinal and generic representation; preponderance of endemic species, often belonging to endemic genera; woody and often subarboreous habit of a large number of the species; prevalence of small, narrow leaves, and absence or great rarity of brilliantly coloured flowers; but the exceptions of different kinds are numerous, and each island or group of islands usually presents some special feature.

For phyto-geographical purposes Insular Floras may be divided into three categories, based upon their endemic element:—1. Vegetation comprising a large endemic element, including distinct generic types, the nearest affinities of which are not always all to be found in any one continent; 2. Vegetation comprising a small, chiefly specific, endemic element, the derivation of which is easily traced; and 3. Vegetation comprising no endemic element. To the first category belong St Helena, Juan Fernandez, the Sandwich, Galapagos, and Seychelles groups; to the second, the Bermudas, Azores, Ascension, the islands in the southern part of the Indian Ocean, and the Admiralty Islands; to the third, the Keeling, and numerous other rising coral islands in the Indian and Pacific Oceans. This classification is not altogether satisfactory, because, if extended to islands generally, the second category must include insular floras in which there is no endemic element; such, for example, as Spitzbergen and Iceland; but the difficulty is more apparent than real, as the third category is intended to be limited to islands which have become stocked with plants in comparatively recent times.

Before proceeding to the discussion of the means by which these various islands became, or probably became, endowed with flowering plants, we will give some details of the vegetation of some islands and groups of islands not touched upon in the Reports; and also fuller particulars concerning the general distribution of certain natural Orders, together with other evidence bearing upon the inquiry.

[1] We repeat here that any plant that has certainly or apparently reached an island independently of human agency, no matter how recently, nor how sparsely it may be represented individually, is regarded as indigenous.

LISTS OF THE PLANTS AND ANALYSES OF THE COMPOSITION OF THE FLORAS OF VARIOUS ISLANDS NOT INCLUDED IN THE REPORTS.

I.—VEGETATION CONTAINING A LARGE ENDEMIC ELEMENT, INCLUDING DISTINCT GENERIC TYPES.

THE SANDWICH ISLANDS.[1]

"Of the flowering plants, the most remarkable family is the Lobeliaceæ, represented by six genera, five peculiar to the Hawaiian Islands, and thirty-five species, all endemic. Many of these, indeed almost all, are arborescent, and some of great interest. Our [the American] explorations added ten new species and one very remarkable genus (*Brighamia*) to this family. The Compositæ hold an important place, as will be seen by the accompanying table, and of these the new genus *Hesperomannia* and four new species were collected for the first time.

"Remy endeavoured to divide the island flora into five zones, but with indifferent success; three are tolerably distinct,—the alluvial plains, the valleys, and the mountain region. The alluvial plains are on the shores, where most of the introduced plants are found. The valleys, which have generally been long the residence of man, and have been cultivated and cleared, are more tropical, and because better watered than the plains, and of richer soil than the mountains, are filled with a much more luxuriant vegetation; in this region are found most of the introduced fruits. The third, or mountain region, extends from the grass lands which usually occupy the lower slopes of the mountains as high as eight hundred or a thousand feet, almost to the limit of vegetation, and this point is determined by the aspect; on the windward side of Mauna Kéa it is at a height of nearly twelve thousand feet, while on the lee of Mauna Lóa it is no higher than eight thousand. There is no truly alpine zone; the trees and shrubs of the lower regions become stunted, and finally disappear, and the upper regions are wholly destitute of vegetable life. *Dodonæa*, *Sophora*, *Osteomeles*, *Vaccinium*, *Gouania orbicularis*, are found near the upper limits. The timber of the forest is largely *Metrosideros*, and *Acacia koa*, while the *Aleurites* is abundant. It is in the dense woods of the lower slopes (three thousand to four thousand feet) that the tree-ferns, and lower still the Lobeliaceæ, the Labiatæ, and the *Cordyline* are found.

"The regions yielding the richest harvest of species lie between fifteen hundred and six thousand feet above the sea. *Drosera longifolia* is found at an elevation of eight thousand feet, many thousand miles from its nearest known habitat. There are but few showy flowers, and still fewer fragrant ones, in the Hawaiian flora. The genera *Hibiscus*, *Gardenia*, *Bryonia*, *Brighamia*, *Metrosideros*, *Eugenia*, *Scævola*, *Cyrtandra*, *Phyllostegia*, with a few Compositæ, Convolvulaceæ, and Leguminosæ, comprise nearly all the showy or beautiful flowers. In the colouring, white or greenish-white is predominant, and yellow and pink follow at a respectful distance. There are very few blue flowers. *Strongylodon lucidum* is a rich crimson, and some other leguminous plants are violet, but the various and brilliant colouring of the Californian plants is wholly absent.

[1] An analysis of H. Mann's Enumeration of the Plants, by W. T. Brigham, extracted from the *Proceedings of the Boston Society of Natural History*, xii., 1868. This is reproduced without the modifications necessary to bring it in harmony with Bentham and Hooker's Genera Plantarum; but the alterations would be unimportant. See p. 11, and also p. 19, for the distribution and affinities of the arboreous Compositæ.

"It is a matter of great interest to ascertain the indigenous fruits. The cocoa-nut, pandanus, cordyline, bread-fruit, and kalo, are in the present list regarded as belonging to this class, although many have supposed the natives transplanted them in their migrations, or that oceanic currents drifted them upon the shores. To the former hypothesis the objection presents itself, that the bread-fruit grows on the island only by cuttings, which could not be preserved for so long a voyage as would be required to come from the nearest land,[1] and the kalo (*Colocasia*) does not possess much persistent vitality; to the latter the existing currents would prove an obstacle, as these strike the Hawaiian group from the north-east, bringing huge pine logs from Oregon, but no tropical fruits."

ORDINAL COMPOSITION OF THE FLORA OF THE SANDWICH ISLANDS.

	Genera.	Species.	Endemic. Genera.	Endemic. Species.	Genera of Endemic Species only.	Orders of Endemic Species only.		Genera.	Species.	Endemic. Genera.	Endemic. Species.	Genera of Endemic Species only.	Orders of Endemic Species only.
Amarantaceæ	5	9	2	3	...	...	Menispermaceæ	2	3	...	1	...	...
Anacardiaceæ	1	1	...	...	...	...	Myoporineæ	1	1	1	1	...	*
Apocynaceæ	4	5	...	4	3	...	Myrsineæ	1	3	...	3	1	*
Araliaceæ	6	7	3	7	2	*	Myrtaceæ	3	6	...	2	...	...
Aroideæ	2	2	...	...	...	...	Naiadaceæ	3	5	...	...	...	...
Basellaceæ	1	1	...	...	...	...	Nyctagineæ	2	3	...	...	...	...
Begoniaceæ	1	1	1	1	...	*	Oleaceæ	1	1	...	1	1	*
Bixaceæ	1	1	...	1	1	*	Onagrariceæ	1	1	...	...	...	...
Boraginaceæ	3	4	...	...	...	...	Orchideæ	2	3	1	3	1	...
Capparidaceæ	2	2	...	1	...	...	Palmæ	2	4	1	3	1	...
Caryophyllaceæ	3	14	2	14	1	*	Pandanaceæ	2	2	...	1	1	...
Celastrineæ	1	1	...	1	1	*	Papayaceæ	1	1	...	...	...	...
Chenopodiaceæ	2	5	...	1	...	...	Phytolaccaceæ	1	1	...	...	...	...
Commelinaceæ	2	2	...	...	...	...	Piperaceæ	2	13	...	8	...	...
Compositæ	24	59	6	46	5	...	Pittosporeæ	1	6	...	6	1	*
Convolvulaceæ	6	13	...	5	3	...	Plantagineæ	1	3	...	2	...	...
Cruciferæ	3	4	...	2	1	...	Plumbagineæ	1	1	...	...	...	...
Cucurbitaceæ	3	6	1	4	...	...	Polygonaceæ	2	3	...	1	...	...
Cyperaceæ	14	40	2	22	6	...	Portulaceæ	2	3	...	2	1	...
Dioscoreaceæ	2	2	...	...	...	...	Primulaceæ	1	2	...	1	...	...
Droseraceæ	1	1	...	...	...	...	Ranunculaceæ	1	2	...	2	1	*
Ebenaceæ	1	2	...	2	1	*	Rhamnaceæ	3	7	...	5	1	...
Epacrideæ	1	2	...	...	...	...	Rosaceæ	4	5	1	4	3	...
Ericaceæ	1	2	...	2	1	*	Rubiaceæ	13	33	3	28	5	...
Euphorbiaceæ	7	14	...	8	2	...	Rutaceæ	4	17	2	17	2	*
Gentianaceæ	1	1	...	1	1	*	Santalaceæ	2	3	...	3	2	...
Geraniaceæ	2	6	...	4	1	...	Sapindaceæ	2	3	...	...	...	...
Gesneraceæ	1	14	...	13	1	*	Sapotaceæ	1	1	...	1	1	*
Goodeniaceæ	1	6	...	5	1	...	Saxifrageæ	1	1	...	1	1	*
Guttiferæ	1	1	...	...	...	...	Scrophulariaceæ	2	2	...	...	...	...
Haloragaceæ	1	1	...	1	1	*	Smilacineæ	1	3	...	3	...	...
Hydrophyllaceæ	1	1	...	1	1	*	Solanaceæ	4	12	1	9	1	...
Ilicineæ	1	1	1	1	...	*	Sterculiaceæ	2	3	...	1	...	...
Iridaceæ	1	1	...	1	1	*	Taccaceæ	1	1	...	...	...	...
Juncaceæ	2	2	...	1	...	...	Ternstrœmiaceæ	1	1	...	1	1	*
Labiatæ	4	29	2	28	1	...	Thymelæaceæ	1	6	...	5	...	...
Lauraceæ	2	2	...	1	1	...	Tiliaceæ	1	1	...	1	1	*
Leguminosæ	19	29	...	11	5	...	Umbelliferæ	3	3	...	1	1	...
Liliaceæ	4	5	...	3	2	...	Urticaceæ	11	14	2	8	4	...
Lobeliaceæ	6	35	5	35	1	*	Verbenaceæ	4	4	...	...	...	...
Loganiaceæ	1	5	1	5	...	*	Violarieæ	2	6	1	6	1	*
Loranthaceæ	1	1	...	...	...	...	Zingiberaceæ	2	2	...	...	...	...
Lythrarieæ	2	2	...	...	...	...	Zygophyllaceæ	1	1	...	...	...	...
Malvaceæ	6	16	...	10	...	...	Totals	253	554	39	376	76	26

[1] See S. B. Dole, Voyages of the Ancient Hawaiians. Hawaiian Club Papers, 1868, p. 4.

Taking all the plants, both native and introduced, we have as the proportion of species to each genus,	2·58
To endemic genera alone,	3·94
To genera represented only by endemic species,	1·28
To introduced genera,	1·07
Endemic genera of only one species,	16
Genera of a single endemic species,	49
Introduced genera of one species,	43
Other genera of one species,	45
Percentage of all the endemic species,	68·05
,, ,, species of endemic genera,	28·0
,, ,, introduced species,	12·46

The grasses were left undetermined by Mann, and are not included in the foregoing figures. About twenty-two species have been recorded, four of which are endemic.

Since the publication of Mann's Enumeration of Hawaiian Plants and the foregoing analysis of it, Dr H. Wawra, who spent four months in the islands during the cruise of the Austrian frigate "Donau," and formed very extensive botanical collections, has made two important contributions to our knowledge of their vegetation, in the Flora for 1872–75, and the Œsterreichische Botanische Zeitung for 1872 and 1873. Judging from a superficial examination, the latter is by far the most complete account of the aspects of the vegetation of the Sandwich Islands in existence; and the former not only contains descriptions of between forty and fifty new species of flowering plants, besides a large number of varieties, but it likewise includes full descriptions of many previously imperfectly known plants. It is singular with this very considerable accession of species there is nothing generically new, for Wawra does not appear to have established critical species. Dr Engler (Versuch einer Entwicklungsgeschichte der Pflanzenwelt, ii. pp. 104–145), has fully tabulated the distribution of all the Sandwich Islands vascular plants with reference to their nearest allies; and he finds that 500, or 74·6 per cent. of the 669 species which he regards as indigenous, are endemic. The vascular cryptogams number 140, whereof 57 are endemic, thus leaving 529 flowering plants, 443 of which are endemic.

A further addition has been made to the number of endemic species in the Sandwich Islands flora in Mr C. B. Clarke's monograph of the Cyrtandreæ,[1] a group of plants widely spread in Polynesia, from which we extract the following particulars of the distribution of this tribe and of the genus *Cyrtandra*, the only one represented in this group.

The Gesnereæ are restricted to America, while the Cyrtandreæ are almost confined to the Old World; the great body of the tribe being situated in South-east Asia, extending from India to Japan and New Guinea; a single genus, *Cyrtandra*, having numerous species scattered through Polynesia to Tahiti and the Sandwich Isles. The Cyrtandreæ may be conceived as nearly continuous over this area, abounding both in variety of forms and number of individuals. External to this area we find only a few small groups,

[1] In De Candolle's Suites au Prodromus Systematis Naturalis Regni Vegetabilis, vol. v. par. 1.

namely: in Europe, one species of *Ramondia* in the Pyrenees, and three species of *Ramondia* and *Haberlea* in the Balkans; in Africa, from the Cape to the Cameroons and Zanzibar and Madagascar, twenty species, of which eighteen belong to the endemic genus *Streptocarpus*; in Australia four species, and in New Zealand one, belonging to the endemic *Rhabdothamnus*. The distribution of the species of *Cyrtandra* is somewhat remarkable, and offers an example of an Old World genus extending to the Sandwich Islands, and there developing numerous forms. Clarke defines 167 species, whereof 151 are endemic, as far as at present known, in a single island or group of small islands as follows:—Penang, 1; Sumatra, 21; Java, 10; Ceram, 1; New Guinea, 4; Halmaheira, 1; Ternate, 1; Celebes, 3; Borneo, 24; Philippine Islands, 6; Ualan, Caroline Islands, 1; New Hebrides, 2; Fijis, 20; Samoa, 9; Tahiti, 11; and the Sandwich Islands, 36. Of the last, 16 appear to be confined to Oahu, 4 to Hawaii, and 7 to Kauai.

THE GALAPAGOS.

The flora of these islands not only contains a large number of species not found elsewhere, but, what is more remarkable, each island of the group has its endemic species of plants; and Darwin states that this feature is almost as strongly developed in the animal kingdom. Andersson's essay[1] on the vegetation of the Galapagos is the latest, and further accentuates this peculiarity, which was first brought to light in Sir Joseph Hooker's elaboration of the collections made by Darwin, Edmonstone, Macrae, and others. He enumerates 332 species of phanerogamous plants; but the group has by no means been exhaustively botanised, some of the islands being apparently still virgin ground. Chatham, Charles, Albemarle, and James, are the islands whence Hooker had collections, and Andersson hastily visited these four islands, as well as Indefatigable. Of the whole number of flowering plants hitherto collected, 158 are common to other regions, while 174, or more than half, are peculiar to the islands; and, excluding evidently introduced species, the proportion of endemic species would be still higher.[2] Taking the endemic species, only five of them are known to occur in all five of the islands named; only two in four of the islands; and only six in three of the islands. Sixteen of the endemic species are found in Chatham and Charles Islands; three in Chatham and Indefatigable; seven in Chatham and Albemarle; four in Chatham and James; two in Charles and Indefatigable; four in Charles and Albemarle; four in Charles and James; and two in James and Albemarle. The numbers of species hitherto collected in only one island are: Charles, 40; James, 27; Chatham, 26; Albemarle, 21; and Indefatigable, 29. Besides these there are three species peculiar to the group, but it is not known in which island or islands they were collected.

[1] Linnæa, xxxi. p. 609 (German translation of the original Swedish).

[2] This would be about counterbalanced by deducting some of the forms treated as species by Andersson which we should regard as varieties.

Here, as in so many Oceanic Islands, woody Compositæ are prominent among the endemic plants. Bentham[1] states that none of the Galapagos Compositæ show any tendency to the arborescent forms observable in the more isolated insular groups, but Andersson says "fifteen of the species are bushy, and several of them reach a height of eight to ten ells, and nearly as much in circumference, thus resembling small trees." What is more definite, he describes *Macræa laricifolia* as "fere biorgyalis," and *Scalesia decurrens* as "bi-triorgyalis;" heights not surpassed by many of the Juan Fernandez and St Helena arboreous members of the same Order. Four or five independent genera of Compositæ have been founded on Galapagos plants, but only two of them are retained in Bentham and Hooker's Genera Plantarum, the others being treated as sections of older genera; and the two retained (*Scalesia* and *Lecocarpus*) might without difficulty, Bentham remarks, have been referred to *Mirasolia* and *Melampodium* respectively. Altogether thirty-eight species of Compositæ are known from the group, and of these twenty-seven are endemic. Other Orders largely represented by endemic species are the Rubiaceæ, Boragineæ, Amarantaceæ, Euphorbiaceæ, and Gramineæ. Only two orchids, an *Epidendrum* and a *Govenia*, have been discovered. The affinities of the endemic element of the flora are entirely American; a very few species have congeners in the Sandwich Islands, such for instance as *Lipochæta laricifolia* (*Macræa*), and not in America; but the singular arboreous Lobeliaceæ of the Sandwich Islands, which have their nearest affinities in America, are wholly wanting. Of the species common to the Galapagos and other countries, Andersson finds that forty-two of them are also found in Africa; forty in India and the Malayan Archipelago; fifteen in Australia; and forty-three are more or less widely spread in Polynesia.

THE SEYCHELLES.

This group consists of upwards of thirty islands, about 900 miles distant from Madagascar, the largest, Mahé, being seventeen miles long, and about 30,000 acres in area, with an altitude of 3000 feet. According to Baker (Flora of Mauritius, Preface, p. 16*), the number of wild flowering plants and ferns then (1877) known to grow in the Seychelles was 338, of which sixty are endemic. Besides the sixty endemic species, between twenty and thirty are characteristic Mascarene types, and the remaining 250 mostly plants of wide dispersion. The composition of the endemic element in the flora of the Seychelles is totally different from that of any other oceanic group, yet it is not less remarkable. Out of the sixty endemic species, fourteen are Rubiaceæ, two are Compositæ, two are Orchideæ, three are *Pandanus*, and six are vascular cryptogams. With the exception of *Medusagyne oppositifolia*, a monotypic genus of the Ternstrœmiaceæ, the endemic genera are all Palmæ. They are: *Lodoicea sechellarum*, *Deckenia nobilis*,[2] *Nephrosperma vanhoutteana*,

[1] *Journal of the Linnean Society of London*, xiii. p. 557.

[2] In Bentham and Hooker's Genera Plantarum, iii. p. 898, *Deckenia* is reduced to the peculiarly Mascarene genus *Acanthophœnix*.

Roscheria melanochætes, *Verschaffeltia splendida*, and *Stevensonia grandifolia*—five of them distinct monotypic genera. It may be mentioned that the cocoa-nut palm does not exist in a wild state in any of the Mascarene Islands. Shaw (Madagascar and France, 1885, p. 287), says it exists in Madagascar only near the present or former habitations of foreigners.

RODRIGUEZ.

The present flora of this island has been recently investigated by Dr Bayley Balfour, and from his report thereon (Proc. Roy. Soc. Lond., clxviii.) the following particulars were gleaned. Of flowering plants considered as indigenous, there are 175 species, belonging to 119 genera and 57 orders. The monocotyledons number 49 species, a comparatively large proportion. There are 35 endemic species, or one-fifth of the whole, six of them being monocotyledons; 31 species are peculiarly Mascarene; and of the rest 8 are African plants which do not occur in Asia, whilst 14 species are found in Asia, but do not reach Africa. Of the remaining 88, 22 are widely spread in the tropics of the Old World, and 66 are universal tropical weeds. The orders most largely represented in the indigenous flora are: Gramineæ, 21 species; Leguminosæ, 14; Convolvulaceæ, 11; Malvaceæ, 9; Rubiaceæ, Cyperaceæ, and Euphorbiaceæ, each 8; Liliaceæ, 6; Compositæ, and Amarantaceæ, 5 each. A large proportion of the Leguminosæ and Convolvulaceæ are very widely diffused littoral plants, and there is no endemic species of either order. Perhaps the most remarkable feature in this insular flora is the extraordinary heteromorphism in the foliage of many of the shrubby and arboreous species in different stages of their growth. The endemic plants are:[1]—

Rutaceæ.
Zanthoxylum pinnatum.

Meliaceæ.
†*Quivisia laciniata.*

Anacardiaceæ.
Sclerocarya castanea.

Myrtaceæ.
Eugenia balfouri.

Turneraceæ.
**Mathurina penduliflora.*

Rubiaceæ.
†*Danais corymbosa.*
Randia heterophylla.
†*Pyrostria trilocularis.*
**Scyphochlamys revoluta.*
Psychotria lanceolata.

Compositæ.
Psiadia coronopus.
„ *rodriguesiana.*
Abrotanella rhynchocarpæ.

Lobeliaceæ.
Lobelia vagans.

Ebenaceæ.
Diospyros diversifolia.

Asclepiadaceæ.
**Tanulepis sphenophylla.*
Sarcostemma odontolepis.

Acanthaceæ.
Hypoestes rodriguesiana.
„ *inconspicua.*

Verbenaceæ.
Nesogenes decumbens.
Clerodendron laciniatum.

[1] The genera preceded by a * are endemic; and those preceded by a † are peculiarly Mascarene. *Sclerocarya*, *Psiadia*, *Distrostachys*, and *Aloe* are African; *Sarcostemma*, *Hypoestes*, *Ærua*, and *Pandanus* are confined to the Old World, and the rest are generally dispersed in the tropics.

NYCTAGINEÆ.
Pisonia viscosa.

AMARANTACEÆ.
Ærua congesta.

PIPERACEÆ.
Peperomia hirta.
„ *reticulata.*
„ *rodriguezi.*

EUPHORBIACEÆ.
Euphorbia daphnoides.
Phyllanthus dumetosus.

URTICACEÆ.
Pilea balfouri.

ORCHIDEÆ.
Listrostachys aphrodite.

LILIACEÆ.
Aloe lomatophylloides.

PALMÆ.
†*Latania verschaffelti.*
†*Hyophorbe verschaffelti.*

PANDANEÆ.
Pandanus heterocarpus.
„ *tenuifolius.*

II.—VEGETATION CONTAINING A SMALL, CHIEFLY SPECIFIC ENDEMIC ELEMENT.

MARIANNE ISLANDS, NORTH-WESTERN POLYNESIA.[1]

CAPPARIDACEÆ.
Polanisia viscosa, DC.
Capparis mariana, Jacq.

GUTTIFERÆ.
Calophyllum inophyllum, Linn.

MALVACEÆ.
Hibiscus manihot, Linn.
„ *rosa-sinensis*, Linn.
„ *tiliaceus*, Linn.
Sida glomerata, Cav.
„ *carpinifolia*, Linn. f.
„ *rhombifolia*, Linn.
„ *maura*, Link.[2]

STERCULIACEÆ.
Heritiera littoralis, Ait.
Waltheria elliptica, Cav.

TILIACEÆ.
Triumfetta fabreana, Gaudich.
Corchorus torresianus, Gaudich.

SAPINDACEÆ.
Cardiospermum halicacabum, Linn.
Dodonæa viscosa, Linn.

LEGUMINOSÆ.
Tephrosia mariana, DC.
Desmodium australe, DC.
Mucuna gigantea, DC.
Cassia angustissima, Lam.
Entada purszetha, DC.
Inga javana, DC.

RHIZOPHOREÆ.
Bruguiera gymnorhiza, Lam.

COMBRETACEÆ.
Terminalia moluccana, Lam.
Laguncularia hænkei, Endl.
„ *purpurea*, Gaudich.

MYRTACEÆ.
Psidium pomiferum, Linn.

[1] Extracted without alterations from Endlicher's Synopsis Floræ Insularum Oceani Australis. It will be seen that a large number of the plants are the same as are found in the South-eastern Moluccas and the Admiralty Islands, and many of the names stand as synonyms in this work. Very few of the species described as new from these islands by Gaudichaud, Presl, De Candolle, and others, are represented by authenticated specimens in the London Herbaria, therefore we are unable to estimate the endemic element; but, so far as the flora is known, this element is limited to species.

[2] "*Sida maura*, Link," does not occur in the work cited by Endlicher, nor do we find it elsewhere. Probably it should have been *Sida mauritiana*, a synonym of *Abutilon indicum*, which is very widely dispersed in the tropics of the Old World.

Barringtonia speciosa, Linn. f.
,, *racemosa*, Gaudich.

MELASTOMACEÆ.

Melinilla rosea, Gaudich.

LYTHRARIEÆ.

Ammannia octandra, Linn.
Pemphis acidula, Forst.

RUBIACEÆ.

Geophila reniformis, Cham. et Schlecht.
Mitrocarpum torresianum, Cham. et Schlecht.

COMPOSITÆ.

Vernonia chinensis, Less.
Elephantopus carolinianus, Willd.
Distreptus spicatus, Cass. = *Elephantopus*.
Adenostemma viscosum, Forst.
Glossogyne tenuifolia, Cass.
Eclipta erecta, Linn.
Wedelia chamissonis, Less.
Verbesina? argentea, Gaudich.
Artemisia vulgaris, Linn.

LOBELIACEÆ.

Scævola kœnigii, Vahl.

APOCYNACEÆ.

Alyxia torresiana, Gaudich.

BORAGINACEÆ.

Carmona heterophylla, Cav. = *Ehretia*.
Heliotropium zeylanicum, Lam.
Tiaridium indicum, Lehm. = *Heliotropium*.
Tournefortia argentea, Linn.

CONVOLVULACEÆ.

Ipomœa maritima, R. Br.

SOLANACEÆ.

Physalis lanceifolia, Nees.
Lycopersicum cerasiforme, Dun.

SCROPHULARINEÆ.

Limnophila gratioloides, R. Br.
,, *serrata*, Gaudich.

VERBENACEÆ.

Vitex incisa, Lam.
Premna integrifolia, Linn.

LABIATEÆ.

Ocimum canum, Sims.
,, *sanctum*, Linn.
Hyptis capitata, Jacq.
,, *pectinata*, Poir.

NYCTAGINEÆ.

Boerhaavia hirsuta, Linn.

AMARANTACEÆ.

Amarantus spinosus, Linn.

POLYGONACEÆ.

Polygonum barbatum, Willd.

PIPERACEÆ.

Piper betel, Linn.
,, *potamogetonifolium*, Opiz.
,, *marianum*, Opiz.

EUPHORBIACEÆ.

Phyllanthus nirari, Linn.
Euphorbia pilulifera, Linn.

URTICACEÆ.

Bœhmeria paniculata, Endl.
Procris candolleana, Gaudich.
,, *nivea*, Gaudich.
,, *torresiana*, Endl.
,, *divaricata*, Endl.

CYCADACEÆ.

Cycas circinalis, Linn.

HYDROCHARIDEÆ.

Halophila ovata, Gaudich.

ORCHIDEÆ.

Cymbidium triste, Willd.
Limodorum fasciola, Swartz.
Nervilia arragoana, Gaudich. = *Pogonia*.
,, *ovata*, Gaudich.

SCITAMINEÆ.

Canna indica, Ait.
Zingiber zerumbet, Rosc.
Musa textilis, Nees.

COMMELINACEÆ.

Commelina spp.

PALMÆ.

Areca oleracea, Linn.?

NAIADACEÆ.

Potamogeton gaudichaudii, Cham.
„ *fluitans*, *a. mariannensis*, Cham.

CYPERACEÆ.

Cyperus pennatus, Lam.
„ *difformis*, Linn.
Kyllinga monocephala, Rottb.
Fuirena umbellata, Rottb.
Fimbristylis puberula, Vahl.
„ *marianna*, Gaudich.
„ *littoralis*, Gaudich.
„ *pilosa*, Vahl.
„ *affinis*, Presl.
„ *torresiana*, Gaudich.
Isolepis miliacea, Presl.
„ *willdenowii*, Roem. et Schult.
Eleocharis plantaginea, Roem. et Schult.
„ *atropurpurea*, Presl.
Rhynchospora aurea, Vahl.
Baumea mariscoides, Gaudich. (*Cladium*).
Carex fuirenoides, Gaudich.
„ *compacta*, Presl.

GRAMINEÆ.

Paspalum orbiculare, Forst.
„ *cartilagineum*, Presl.
Panicum subquadriparum, Trin.
„ *gaudichaudii*, Kunth.
Isachne minutula, Kunth.
Oplismenus colonus, Humb. et Kth.
Setaria glauca, Beauv.
Dactyloctenium ægyptiacum, Willd.
Bambusa arundinacea, Willd.?
Poa tenella, Linn.
Centotheca lappacea, Desv.
Haplachne pilosissima, Presl = *Dimeria*.
Andropogon chloridiformis, Gaudich.

Kittlitz gives three views of the vegetation of Guam or Guaham, one of the Marianne Islands, in which the genera *Cycas*, *Casuarina*, *Ficus*, *Pandanus*, *Cordia*, *Cerbera*, *Terminalia*, *Artocarpus*, *Barringtonia*, *Hernandia*, *Thespesia*, and *Calophyllum* are conspicuous.

ELIZABETH ISLAND. (About 128° W. long., and 24° S. lat.)[1]

Guettarda speciosa, *Cephælis fragrans* (Bot. Beech. Voy., t. 13), *Tournefortia argentea*, and *Euphorbia ramosissima* were collected by Beechey and Cuming on this island. The latter also collected a few ferns, and one or two doubtful flowering plants. *Cephælis fragrans* (*Ixora?*) is only known from Elizabeth Island.

EASTER ISLAND. (About 109° W. long., and 27° S. lat.)

Endlicher enumerates the following plants from Easter Island:—

Sapindus saponaria, Forst.
Thespesia populnea, Corr.
Lagenaria vulgaris, Ser.
Samolus littoralis, R. Br.
Curcuma longa, Linn.
Lepturus repens, R. Br.
Deyeuxia chamissonis, Kunth.
„ *forsteri*, Kunth.
Agrostis conspicua, Willd.
Paspalum filiforme, Sw.

A few other plants, including *Sophora tetraptera*, *Sesuvium portulacastrum*, and other equally widely spread plants, have been collected in the island. There may be a fuller representation of the vegetation of this and other islands of Eastern Polynesia in the old collections at the British Museum, but it hardly came within the scope of this

[1] These are mere rough approximations, taken from one of Stanford's large educational maps, to give the reader an idea of the positions of the islands.

work to look up the plants. We know, however, from Captain Cook's description of the island, that wood is wanting altogether; his party on two excursions met with only two or three shrubs, one of them, from the description, doubtless *Sophora*. The generally diffused large Polynesian tree *Metrosideros polymorpha*, which is found in Pitcairn and Elizabeth Islands, and forms extensive forests in some of the groups, especially in the Sandwich Islands, seems to be absent.

III.—VEGETATION CONTAINING NO ENDEMIC ELEMENT.

ISLANDS OF THE INDIAN OCEAN.

List of Plants in the Kew Herbarium collected in some of the smaller Tropical Islands by Dr Coppinger.[1]

Cleome (§ *Polanisia*) *strigosa*, Oliv. Du Lise Island, Gloriosa group.
Portulaca oleracea, Linn. Bird Island, Seychelles group.
Portulaca quadrifida, Linn. Eagle Island, Amirante group, Du Lise Island.
Calophyllum inophyllum, Linn. Isle des Roches, Amirante group.
Sida carpinifolia, Linn. f. Providence Island, Mascarene group.
Sida spinosa, Linn. Du Lise Island, Isle des Roches, Cerf Islet (No. 1), Providence Reef.
Abutilon indicum, Don. Bird Island, Providence Island, Isle des Roches.
Hibiscus hornei, Baker. Du Lise Island.
Thespesia populnea, Corr. Du Lise Island.
Triumfetta procumbens, Forst. Providence Island, Isle des Roches.
Tribulus terrestris, Linn. Eagle Island, Amirante group.
Sesbania aculeata, Pers. Bird Island, Eagle Island.
Cassia occidentalis, Linn. Providence Island.
Desmanthus virgatus, Willd. Providence Island.
Pemphis acidula, Forst. Du Lise Island, Poivre Island, Amirante group.
Suriana maritima, Linn. Bird Island, Cerf Islet (No. 3), Providence Reef, Isle des Roches.
Carica papaya, Linn. Providence Island.
Cucumis trigonus, Roxb. Du Lise Island.
Morinda citrifolia, Linn. Isle des Roches.
Guettarda speciosa, Linn. Poivre Island.
Vernonia cinerea, Less. Isle des Roches.
Tridax procumbens, Linn. Isle des Roches.
Scævola kœnigii, R. Br. Isle des Roches.
Ochrosia borbonica, Gmel. Providence Island, Alphonse Island, Mascarene group.
Cordia subcordata, Lam. Du Lise Island.
Tournefortia argentea, Linn. f. Bird Island, Cerf Islet (No. 1), Providence Reef, Poivre Island.
Ipomœa grandiflora, Lam. (non Roxb.)
„ *glaberrima*, Bojer. Providence Island, Du Lise Island.
Solanum nodiflorum, Jacq. Du Lise Island.
Physalis angulata, Linn. Du Lise Island.
Datura alba, Nees. Isle des Roches.
Striga hirsuta, Lour. Providence Island, Isle des Roches.
Boerhaavia diffusa, Linn. Du Lise Island, Providence Island.
Achyranthes aspera, Linn. Eagle Island.
Amarantus caudatus, Linn. Providence Island, Eagle Island.
Amarantus retroflexus, Linn. Providence Island.
Hernandia peltata, Meissn. Alphonse Island, Providence Island.
Cassytha filiformis, Linn. Isle des Roches, Providence Island.
Euphorbia pilulifera, Linn. Providence Island.
„ *prostrata*, Ait. Du Lise Island, Providence Island.
Ficus nautarum, Baker. Alphonse Island.
Pipturus argenteus, Wedd. Isle des Roches.

[1] For lists of plants from the Cocos and Chagos Islands, see Part III., pp. 113–115.

Fleurya æstuans, Gaud. Eagle Island, Providence Island.
Casuarina equisetifolia, Forst. Poivre Island.
Cyperus ligularis, Linn. Eagle Island, Providence Island.
Cyperus rotundus, Linn. Du Lise Island.
Fimbristylis glomerata, Nees. Providence Island.
Setaria glauca, Beauv. Gloriosa Island.
Eleusine ægyptiaca, Pers. Bird Island, Providence Island, Eagle Island.
Eragrostis tenella, Beauv. Du Lise Island.
Nephrolepis exaltata, Schott. Isle des Roches.

Summary.

Du Lise Island, Gloriosa group	15 species.	Cerf Islets, Providence Reef	4 species.
Bird Island, Seychelles group	6 „	Poivre Island, Amirante group	4 „
Eagle Island, Amirante group	8 „	Alphonse Island, Mascarene group	3 „
Isle des Roches, Amirante group	14 „	Gloriosa Island	1 „
Providence Island, Mascarene group	20 „		

The majority of the plants in the foregoing list are very widely spread, and details of their distribution will be found in the geographical tables and lists in Part III., pp. 107–117, and pp. 232, 233; but there are a few exceptions, which are interesting as indicating a probable former closer connection of the islands of this region. They are appended with their distribution:—

Cleome (*Polanisia*) *strigosa* . . . . . Island of Zanzibar and Mozambique.
Hibiscus hornei . . . . . Praslin Island, Seychelles: endemic.
Ochrosia borbonica . . . . . Mauritius, Seychelles, Bourbon.
Ficus nautarum . . . . . Seychelles.

SMALLER PACIFIC ISLANDS.[1]

Marshall Islands (North-western Polynesia).

To the Berliner Gartenzeitung of 1884, E. Betche contributes a sketch of the Vegetation of the Marshall Islands, where he spent six weeks, but succeeded in finding only fifty-six species of plants, though he visited six of the Atolls. He mentions the following:—

Calophyllum inophyllum.
Triumfetta sp.
Pemphis acidula.
Terminalia sp.
Barringtonia speciosa.
Morinda citrifolia.
Scævola koenigii.
Cerbera sp.
Tabernæmontana.
Tournefortia argentea.
Cassytha sp.
Hernandia peltata.
Tacca sp.
Pandanus odoratissimus.
Thouarea sp.

Maldon Island. (About 155° W. long., and 4° S. lat.)

Among the unpublished lists of plants from various parts of the world, in the Kew Herbarium, is the following by Sir Joseph Hooker. They were collected by James Macrae,

[1] For lists of plants from a number of other Pacific Islands, see Part III., p. 116.

who travelled for the Horticultural Society of London, from 1824 to 1826, and visited among other places Maldon, the Sandwich, and one of the Galapagos Islands.

Lepidium piscidium, Forst.
Portulaca oleracea, Linn.
Talinum patens, Linn.
Sida, near *Sida cordifolia*.
Oxalis corniculata ?
Tribulus cistoides, Linn.
Crotolaria sp.
Pemphis acidula, Forst.
Metrosideros obovata, Hook.
Coprosma sp.
Guettarda sp.
Pisonia sp.
Boerhaavia hirsuta, Linn.?
Achyranthes velutina, H. and A.

List of Plants Collected in Caroline Island (150° *W. long., and* 10° *S. lat.*) *in* 1884 *by Dr Dixon, U.S.N.*[1]

This list, it is stated, comprises the entire flora of the island. Cultivated as well as wild plants are included in the original list, but the following are all the wild vascular ones it contains:—

Lepidium piscidium, Forst.
Portulaca (two varieties).
Calophyllum inophyllum, Linn.
Sida fallax, Walp.
Suriana maritima, Linn.
Morinda citrifolia, Linn.
Cordia subcordata, Lam.
Tournefortia argentea, Linn. f.
Heliotropium anomalum, Hook. and Arn.
Boerhaavia sp.
Pisonia grandis, R. Br.
Euphorbia pilulifera, Linn.
Phyllanthus niruri, Linn.
Fleurya ruderalis, Gaud.
Pandanus sp.
Cocos nucifera, Linn. (cult.)
Panicum marginatum ? R. Br.
Eleusine indica, Gærtn.
Eragrostis plumosa, Link.
Lepturus repens, R. Br.
Polypodium phymatodes, Linn.

Pitcairn Island. (About 130° W. long., and 25° S. lat.)

This island was visited by Captain Beechey, and there are specimens of a few plants in the Kew Herbarium collected there by Cuming and others; among them *Hibiscus tiliaceus*, *Osteomeles anthyllidifolia*,[2] *Metrosideros polymorpha*, *Morinda citrifolia*, *Guettarda*

[1] Memoirs of the National [American] Academy of Sciences, ii. 1884, p. 88. This island must not be confounded with the Caroline Archipelago in North-western Polynesia, concerning the botany of which almost nothing is known, though it has been visited by one Russian, and at least one French exploring expedition. Endlicher enumerates only the following seven plants—*Paspalum reimarioides*, Brongn.; *Eleusine indica*, Gærtn.; *Lepturus repens*, R. Br.; *Saccharum insulare*, Brongn.; *Centotheca lappacea*, Desv.; *Ischæmum intermedium*, Brongn.; *Cycas circinalis*, Linn.—three of which are described as endemic. Kittlitz gives four views of the vegetation of Ualan, and two of Lugunor, islands of this archipelago. The plants represented include the common Polynesian species of such genera as *Thespesia*, *Pandanus*, *Cordyline*, *Cocos*, *Scævola*, *Tournefortia*, *Hibiscus*, *Calophyllum*, *Barringtonia*, *Artocarpus*, *Guettarda*, and *Tacca*; and one of the larger trees is said to be a species of *Myristica*.

[2] *Osteomeles* is an outlying genus of Rosaceæ Pomeæ, of which there are about eight or ten species, inhabiting the Andes, and *Osteomeles anthyllidifolia*, which is restricted to Polynesia. This was first collected in the Sandwich Islands by Menzies, and the genus was founded upon it (Lindley in *Trans. Linn. Soc. Lond.*, xiii. p. 98, t. 8).

speciosa, *Cerbera odollam*, *Solanum* sp., *Achyranthes* sp., *Broussonetia papyrifera*, and a few common grasses. We also learn from Beechey's narrative that the Ti (*Cordyline* sp.) grew there; and in a view of the interior of the island in the same work, a large fig-tree is represented amidst cocoa-nut palms.

EXAMINATION OF SOME OF THE SPECIAL FEATURES OF INSULAR FLORAS.

ENDEMIC ARBOREOUS AND SHRUBBY COMPOSITÆ IN OCEANIC ISLANDS.[1]

The Sandwich Islands.

Genera.	Number of Species.	Sub-order.	Affinities of Genus or Species.	Distribution of Genus.
Tetramolopium	6	Asteroideæ	South extra-tropical American	Endemic.
Lipochæta . .	10	Helianthoideæ	Chiefly American	One species in the Galapagos.
Dubautia . .	3	Helianthoideæ	Mexican	Endemic.
Wilkesia . .	1	Helianthoideæ	Mexican	Endemic.
Raillardia . .	11	Senecionideæ	Mexican	Endemic.
Hesperomannia	1	Mutisiaceæ	Brazilian	Endemic.

Few of the woody Compositæ of the Sandwich Islands are really arboreous in habit and stature, the majority being shrubs, some of them of quite small dimensions. *Raillardia arborea*, A. Gr., and *Hesperomannia arborescens*, A. Gr., are, however, really arboreous, having trunks twenty feet high. The latter is remarkable as the only member of the Mutisiaceæ found in Polynesia proper. Mann states in his Catalogue of the Plants of the Sandwich Islands that only one tree was seen, and that on the summit of Lanai, at about 2500 feet elevation; but Wawra has since collected it sparingly on Waianæ in Oahu.

The Galapagos Islands.

Mr Bentham states (*loc. infr. cit.*, p. 537) that none of the Galapagos Compositæ show any tendency to the arborescent forms observable in the more isolated insular groups; this,

It is the only one with pinnate leaves, and is thus of very different aspect from the Andine species. Besides Cuming's Pitcairn Island specimen, and numerous specimens from the Sandwich Islands, there are in the Kew Herbarium two or three from the Bonin Islands, and one from Maingaia (about 157° W. long., and 22° S. lat.), so that it practically ranges across the Pacific. The haw-like fruit is described as being of a pleasant flavour.

[1] Compiled largely from Mr Bentham's Notes on the Classification, History, and Geographical Distribution of the Compositæ, with particulars of their dimensions from various sources: *Journal of the Linnean Society of London*, xiii. pp. 554–568.

however, as we have explained on p. 11, is hardly correct, for Andersson describes *Macræa laricifolia*, Hook. f. (*Lipochæta*, A. Gr., Helianthoideæ), as "fere biorgyalis," and *Scalesia decurrens*, Anders. (Helianthoideæ), as "bi-triorgyalis"—dimensions exceeded by only a small proportion of the woody Compositæ in other oceanic islands. There are, according to Andersson, fifteen bushy Compositæ in the Galapagos, several of them reaching a height of eight to ten ells.

The Islands of the South Pacific.

The islands of the South Pacific, from the Fijis to the Marquesas, are exceedingly poor in Compositæ, and the only genus of special interest is *Fitchia* (Helianthoideæ), concerning which Bentham (*loc. cit.*, p. 558) says: "Lastly, there is the very remarkable *Fitchia*, found once only, I believe, in each of two different South Sea Islands,[1] and systematically connected with none but the Juan Fernandez *Dendroseris*.[2] Of the whole nineteen or twenty Compositæ [in the South Pacific Islands] this will probably prove to be the only one presenting a remnant of the ancient flora, the only exception to the more or less adventitious character of the South Pacific Compositæ."

Fitchia nutans, Hook. f., is a veritable tree, attaining a height of twenty-five feet.

[1] It is doubtful whether *Fitchia* was collected in Elizabeth Island by Cuming, upon whose specimen, thus labelled, the genus was founded (Hooker's *London Journal of Botany*, iv., 1845, p. 640, t. 23). The label, it is true, bears the name of this island; but we doubt its correctness, because in a manuscript list, of which there are two copies in the Kew library, there is no Compositæ among the numbers included under Elizabeth Island. The number 1424, attached to both the Benthamian and Hookerian specimens of *Fitchia nutans* in the Kew Herbarium, is in Cuming's list under Toubouia or Tubai Island, some twenty-two degrees west of Elizabeth Island. Whether it was actually collected in the last-named island or in Tahiti, where Cuming also collected on the same voyage, is a little uncertain, inasmuch as it has since, as far as we are aware, only been collected in Tahiti. Seemann (Flora Vitiensis, p. 109) questions the accuracy of Cuming's Elizabeth Island locality.

[2] The opposite leaves, paleaceous receptacle, and biaristate achenes point to the Helianthoideæ rather than the Cichoriaceæ, in spite of all the florets being ligulate. By some mischance the generic character in Bentham and Hooker's Genera Plantarum is incorrect and contradictory in some particulars. Nadeaud (Énumération des Plantes Indigènes de l'Ile de Tahiti, p. 49), seems to have had copious specimens under observation, and he expresses the same opinion, in which, he says, he was supported by the eminent botanist, Mr J. E. Planchon, to whom he showed his specimens. Nadeaud suggests the vicinity of *Bidens*, or *Wedelia* and *Wollastonia*, as the systematic position of *Fitchia*; but apart from its habit and ligulate flowers it is not materially different from the St Helena helianthoid *Petrobium arboreum*, R. Br. (*Bidens arborea*, Roxb.), and certainly nearer to it than the other genera named.

A second species (*Fitchia tahitiensis*) is described by Nadeaud. It is a shrub six to twelve feet high, growing in large clumps in various parts of the island, at elevations of between 800 and 1000 metres. And with regard to *Fitchia nutans*, he states that it is spread over nearly all the high summits of the island above an elevation of a thousand metres. This deserves repeating, because the prevalent idea is that this tree is extremely rare. Professor Dana, of the United States South Pacific Exploring Expedition, collected a single specimen of it, according to Gray (Proc. Amer. Acad., v. p. 146), in the mountains of Tahiti, though its rarity is not adduced as the reason. Mr Moseley, however, on a label attached to a specimen in the Kew Herbarium, collected by him in the same island at an altitude of about 4000 feet, states that only one tree was seen, and that was about twenty-five feet high, with a stem nine inches in diameter.

Canary Islands and Madeira.

The Compositæ number about 150 species, whereof half are endemic. Bentham (*loc. cit.*, p. 563) says :—"The insular tendency to a more shrubby form than their continental congeners or allies is also exhibited in *Allagopappus*, *Vieræa*, *Gonospermum*, *Chrysanthemum*, *Senecio*, and *Sonchus*; but there is nothing of the arborescent or highly differentiated character of the *Petrobium* of St Helena, of the *Dendroseris* and others of Juan Fernandez, or of the *Fitchia* of the South Sea Islands."

In this comparison, as in that concerning the Galapagos Compositæ, Bentham seems to have entertained an exaggerated idea of the stature of the St Helena and Juan Fernandez woody members of the order. As already mentioned, Bertero gives the height of three of the larger species of *Dendroseris* as ten to fifteen feet. Two or three of the Madeiran and Canary Island species of *Sonchus*, a genus of the same suborder as *Dendroseris*, attain to about the same size. Thus *Sonchus fruticosus*, Linn. f., is described by Lowe (Manual of the Flora of Madeira, i. p. 552) in the following words :—"Almost subarborescent, and gigantic in all its parts, being from four or five to ten or twelve feet high, with a trunk often as thick as the arm, and the ultimate branches as thick as the forefinger, ending in large spreading or radiating tufts of leaves." The habit of the species of *Dendroseris* represented in Guillemin's Archives de Botanique, i. t. 9, from Gay's drawings, executed in Juan Fernandez, agrees exactly with the foregoing description. *Sonchus arboreus*, DC., a Canary Island species, attains similar dimensions; and *Senecio kleinia*, Schulz Bip., from the same group, equally deserves the appellation "arboreous;" while several of these find their counterparts among the dwarfer species of *Dendroseris*, &c. Finally, *Centaurea arborea*, Webb, is described as "*Frutex speciosissimus*, 12-*pedalis*."

St Helena.

Genera.	Number of Species.	Suborder.	Affinities of Genus or Species.	Distribution of Genus.
Commidendron	4	Asteroideæ	Andine and Australasian	Endemic.
Melanodendron	1	Asteroideæ	Andine and Australasian	Endemic.
Psiadia . . .	1	Asteroideæ	African	Africa, Mascarene Islands.
Petrobium . .	1	Helianthoideæ	Andine and Chilian	Endemic.
Senecio . . .	2	Senecionideræ	African and Australasian species	General.

In regard to size, if not in height, a few of the larger of the arboreous Compositæ of St Helena considerably surpass those of the islands already considered; although, as we

shall presently show, they by no means equal some insular species and many continental ones. At p. 54 of Part II. the extreme heights that we have found for each species are given, and the maximum is twenty feet; and only three of them attain even this height. It is quite probable, however, that the trees forming the dense woods of former times were considerably larger.

JUAN FERNANDEZ AND MASAFUERA.

Genera.	Number of Species.	Suborder.	Affinities of Genus or Species.	Distribution of Genus.
Rhetinodendron .	1	Senecionideæ	With the Sandwich Island *Raillardia*	Endemic.
Robinsonia . . .	6	Senecionideæ		Endemic.
Dendroseris . .	7	Cichoriaceæ	Not closely allied to any genus.	Endemic.

Although these Compositæ are arboreous in habit, they are no more than miniature trees, the extreme height of the tallest of them not exceeding twenty feet, we believe; and the average height of three of the larger species of *Dendroseris* is, or rather was—for some of them are exceedingly rare if not extinct—according to Bertero, ten to fifteen feet. We have treated *Dendroseris* as endemic, but there are imperfect specimens at Kew of what may be a species of this genus from San Ambrosio. In addition to the genera named above, there is a woody endemic species of the widely-spread genus *Erigeron*, closely resembling a Bermudan endemic species. It is remarkable that the Mutisiaceæ, which constitute more than a third of the numerous Chilian Compositæ, are not represented in Juan Fernandez, while the only member of this suborder hitherto collected in the Pacific Islands is the Sandwich Island arboreous *Hesperomannia*.

CHATHAM ISLANDS.

Of the six or seven certainly indigenous Compositæ in these islands, three are woody, and two of them trees of considerable size. *Eurybia traversii*, F. Muell., an outlier of a large Australasian genus of Asteroideæ, differing very little structurally from *Aster* itself, to which Mueller has recently reduced it, is a handsome tree, from thirty to thirty-five feet high, with a trunk often four feet in girth, but almost always hollow, a character it has in common with the Australian arboreous *Eurybia argophylla*. *Eurybia traversii* is generally distributed through the woods of the Chatham Islands, though most abundant near the sea. The second arboreous species, *Senecio huntii*, F. Muell., is a tree often attaining a height of twenty-five feet; it is rare in Chatham Island, but common in Pitt Island.

New Zealand.

At least a quarter of the New Zealand Compositæ are shrubby or arboreous, and these all belong to the Asteroideæ and Senecionideæ. In Hooker's Handbook of the New Zealand Flora, fourteen species are described as trees, namely, *Olearia* (*Eurybia*), 11 species; *Senecio*, 2; and *Brachyglottis*, 1. Besides these, one species of *Cassinia* is said to grow fifteen, and another ten feet high. These numbers do not include the Chatham Islands species referred to above, as they were unknown at the date of the Handbook. Dimensions of only a few are given in the descriptions; but *Olearia dentata*, *Olearia cunninghami*, and *Brachyglottis repanda*, are all credited with a height of twenty feet. Further, Mr D. Petrie (Transactions of the New Zealand Institute, xiii. p. 327) describes *Olearia colensoi* as attaining the dimensions of a tree, often having a stem as much as a foot in diameter. In the Transactions of the New Zealand Institute, i. p. 35, we find the following dimensions of arboreous and subarboreous Compositæ, as they grow in the neighbourhood of Otago, contributed by Mr J. Buchanan: *Olearia operina*, trunk six to eight inches in diameter; *Olearia nitida*, twelve to eighteen inches in diameter; *Olearia dentata*, two to three feet in diameter; and *Olearia ilicifolia*, similar to the last. The measurements of *Olearia dentata* especially, indicate a tree of considerable size. Mr Bentham (*loc. cit.*, p. 568) remarks of the New Zealand Compositæ that "some of the genera present highly developed shrubby species, but none so arborescent as in some of the preceding more perfectly isolated island groups;" yet the dimensions we are able to give of a small proportion of the arboreous species equal at least, if they do not exceed, those of the largest in St Helena, Juan Fernandez, &c. New Zealand may be regarded as intermediate in physical conditions between those remote islands and continental areas, though still possessing more of the character of the former than the latter.

Madagascar.

Madagascar is still less insular in character than New Zealand, being both larger and much nearer to a continent; yet shrubby and arboreous Compositæ abound, some of the largest in the world inhabiting this country. During the last few years our knowledge of the Madagascar flora has been considerably increased by the publication of numerous new plants by Dr Baillon in France, and also by Mr J. G. Baker in England. Mr Baker informs us that the novelties include at least forty shrubby and arboreous Compositæ, and that about half of the Compositæ of the country are woody. It will be sufficient for our purpose to give a few examples of the truly arboreous species. Thus, *Synchodendron ramiflorum* (Inuloideæ) grows at least forty feet high, and *Vernonia fuscopilosa* (Vernoniaceæ) is described as a tree thirty to forty feet high, while several other species of the latter genus are designated trees without any dimensions being given.

MAURITIUS, SEYCHELLES, AND RODRIGUEZ.

Genera.	Number of Species.	Suborder.	Affinities of Genus or Species.	Distribution of Genus.
Vernonia	2	Vernoniaceæ	African species	Wide.
Cylindrocline	1	Inuloideæ	Asiatic and African	Endemic.
Monarrhenus	2	Inuloideæ	Asiatic and African	Endemic.
Psiadia	3	Asteroideæ	African species	Africa, Madagascar, St Helena.
Faujasia	3	Senecionideæ	African *Senecio*	Endemic.
Senecio	3	Senecionideæ	African species	Wide.

None of the woody species of these islands attains the dimensions, or assumes the habit even, of a tree; the tallest is *Senecio appendiculatus*, DC., which is described as a shrub six to ten feet high; but these woody species constitute about half of the Compositæ which can be regarded as certainly indigenous. *Psiadia rodrigueziana*, Balf. f. (Botany of Rodriguez, p. 50), is endemic in Rodriguez, where it is now very rare, though "it must have existed formerly in great abundance, as the limestone plains are in many places thickly strewn with fragments of branches and stems."

CONTINENTAL ARBOREOUS COMPOSITÆ.

Large shrubby Compositæ are so numerous in many continental regions that it is sufficient to indicate such genera as *Vernonia*, in Tropical Asia, Africa, and America; *Eupatorium* and *Baccharis*, especially in South America; *Olearia* in Australia; *Helichrysum* and allies in Africa, South India, and Australia, and *Senecio* in various regions. In Australia especially, shrubby Compositæ form a conspicuous feature in the vegetation. In South Africa and Brazil they are also very numerous, though on the whole of smaller dimensions than the Australian. Still arboreous species are wanting neither in Asia, Africa, South America, nor Australia. A few examples are given of truly arboreous species from various regions; and these might be doubled or trebled, but they are sufficient to give an idea of the wide distribution of arboreous Compositæ, and to prove that there are many continental species of larger dimensions than the insular ones.

AUSTRALIA.

Name.	Suborder.	Extreme Height.
Olearia argophylla	Asteroideæ	60 feet.
Eurybia lirata	„	30 „
Helichrysum diosmifolium	Inuloideæ	20 „
Bedfordia salicina	Senecionideæ	30 „

AFRICA.

Name.	Suborder.	Extreme Height.
Vernonia, various species	Vernoniaceæ	25 feet.
Tarchonanthus camphoratus	Inuloideæ	20 „
Brachylæna discolor	„	20 „
Senecio, various species	Senecionideæ	20 „

INDIA.

Name.	Suborder.	Extreme Height.
Vernonia, various species	Vernoniaceæ	20 feet.

SOUTH AMERICA.

Name.	Suborder.	Extreme Height.
Vanillosmopsis arborea	Vernoniaceæ	30 feet.
Vernonia, various species	„	20–40 „
Piptocarpha axillaris	„	30 „
„ *macropoda*	„	70 „
„ *rotundifolia*	„	30 „
Lychnophora, various species	„	"arbores."
Eremanthus incanus	„	40 feet.
Stifftia, various species	Mutisiaceæ	"arbores."
Eupatorium angulicaule	Eupatoriaceæ	18 feet.
Espeletia neriifolia	Helianthoideæ	15 „
Montanoa excelsa	„	40 „
„ *moritziana*	„	30 „

Some particulars respecting continental counterparts of the insular arboreous genera belonging to other orders are given in Part III., p. 23; and a few pages forward is a paragraph on the woody plants of oceanic islands.

LARGE AND ALMOST UBIQUITOUS NATURAL ORDERS ABSENT OR VERY RARE IN OCEANIC ISLANDS.

In spite of the fact that there is a relatively large ordinal and generic element in Oceanic Floras, it is not surprising that many large and widely spread orders are wholly unrepresented in consequence of the small areas involved; still the total absence, or great rarity, of certain almost ubiquitous orders is remarkable and not easily explained. Thus the Leguminosæ, which in numbers stand next to the Compositæ, and reach the utmost limits of phanerogamic vegetation, both latitudinal and altitudinal, are wanting in a large number of oceanic islands where there is no truly littoral flora. In St Helena, for example, there is not a single certainly indigenous species. It is true, Melliss hazards the assertion respecting *Psoralea pinnata* that "doubtless this plant existed in the island on its discovery," and Roxburgh classes it as indigenous; but Forster, who botanised the island about a quarter of a century before the latter, records only *Psoralea aphylla*, a very distinct species from *Psoralea pinnata*, and remarks that it was probably introduced.

Both Burchell and Melliss record the casting ashore of the seeds of various Leguminosæ (see Part II., p. 80) in St Helena, some of which occasionally germinate; yet, in consequence of the nature of the shore being unfavourable, they fail to establish themselves. Furthermore, not a single species of Leguminosæ is native in any of the islands of the southern Atlantic and Indian Oceans, from the Tristan da Cunha group to Amsterdam, the Macdonald group, and the outlying islands of New Zealand, if we except the problematical existence of *Sophora tetraptera* in the Chatham Islands (Mueller, Vegetation of the Chatham Islands, p. 13). In New Zealand itself native Leguminosæ are rare, and form a very insignificant part of the vegetation: only five or six genera exist, and about fifteen species, mostly belonging to the anomalous genus *Carmichaelia*. Passing on to Juan Fernandez, we there find only the widely dispersed and variable *Sophora tetraptera;* yet Leguminosæ abound in Tasmania and Chili (though absent from the Falklands and south of Magellan Strait), and introduced species flourish wherever strewn on the islands. This want of, or poverty in Leguminosæ, is less apparent in the Polynesian groups, the Galapagos, and the equatorial groups in the Indian Ocean. Nevertheless, endemic genera are unknown, and endemic species are few or altogether wanting. There are no endemic species either in Rodriguez or the Seychelles, and only one, *Acacia heterophylla*, is restricted to the Mauritius and Bourbon; and this is remarkable as being one of the very few phyllodineous Acacias outside of Australia, and also on account of being so closely allied to the endemic Sandwich Island *Acacia koa*, that Bentham (Trans. Linn. Soc. Lond., xxx. p. 482) doubts whether the two forms should be admitted to specific rank. The more remote Pacific Islands possess a few peculiar species associated with others of almost world-wide distribution; and eleven out of twenty-nine species found in the Sandwich Islands are regarded as endemic by Brigham; but this number is almost certainly too high. Thirty species of Leguminosæ are recorded from the Galapagos, being fully one-tenth of the number of flowering plants; yet only seven of them are peculiar to the islands.

The Gymnospermeæ (Coniferæ, Cycadaceæ, and Gnetaceæ) seem absolutely unrepresented in the remoter Oceanic islands, as well as in many relatively near continents. Exceptions are: Bermudas, one species of *Juniperus;* Azores, one endemic species of *Juniperus;* Madeira and the Canaries, three species of *Ephedra*, two or three species of *Juniperus*, and one endemic *Pinus;* and in the southern hemisphere, Norfolk Island and New Caledonia possess Gymnosperms; while in New Zealand there are five genera and about a dozen species, forming a large proportion of the forests. The outlying insular groups, Chatham, Auckland, Campbell, &c., on the other hand, are destitute of Gymnosperms. In the Mauritius there is none, while in Madagascar there is one endemic species each of *Cycas* and *Podocarpus*.

Another group of plants very poorly represented in, or entirely absent from many oceanic islands, is the *Petaliferous Monocotyledons*. They are quite absent from Ascension, St Helena, South Trinidad, the Tristan da Cunha group, and all the islands

eastward to Amsterdam and the Macdonald group. The Bermudas possess three; Falklands, seven; Juan Fernandez, two; the Galapagos, three; and the proportion is small in most insular groups. Orchids are singularly scarce in insular floras; yet they are so widely dispersed, nearly reaching the polar limits of flowering plants, and occupy such a variety of soils and situations, that their rarity in oceanic islands would seem to be due rather to secondary than primary causes.[1] In illustration of this phenomenon, we append a table showing the absence, or number of species inhabiting various islands.

ORCHIDEÆ IN INSULAR FLORAS.

	Number of Species.
I. ARCTIC OCEAN:	
Nova Zembla	0
Spitzbergen	0
II. NORTH ATLANTIC OCEAN:	
Iceland[2]	13
Azores	3
Bermudas	1
Madeira	4
Canaries	6
Cape Verde group	1
III. SOUTH ATLANTIC OCEAN:	
Fernando Noronha	0
Ascension	0
St Helena	0
South Trinidad	0
Tristan da Cunha group	0
South Georgia	0
South Orkney	0
Falklands	4
IV. INDIAN OCEAN:	
Socotra	1
Seychelles	10
Rodriguez	5
Keeling	0
Marion	0
Crozets	0
Kerguelen	0
Heard	0
Amsterdam	0
St Paul	0
V. NORTH PACIFIC OCEAN:	
Sandwich	3
Guadalupe	0
VI. SOUTH PACIFIC OCEAN:	
Galapagos	2
Tahiti	19
Juan Fernandez	0
Masafuera	0
Norfolk Island	5
Kermadec	1
Chatham	10
Aucklands	9
Campbell	2
Macquarie	0

The foregoing selection of islands and islets covers a wide area of the globe, and

[1] How far the absence, or rarity, of Leguminosæ, Gymnospermeæ, and Petaliferous Monocotyledons in oceanic islands, and of the first in the Antarctic regions, may be accidental or due to climatal conditions, is conjectural; the concomitant rarity of insects, however, is a very probable reason so far as the first and last are concerned; but we know too little of the interdependence of plants and insects generally. From the observations of Darwin, Delpino, H. and F. Mueller, and others, it appears certain that fertilisation without insect agency is impossible in many plants, and especially so in a large number of the Leguminosæ and Orchideæ. Gymnospermeæ, on the other hand, are anemophilous. Further, if the seeds of any flowering plants be transportable very long distances by winds, it is those of orchids, for they are most exceedingly minute and light; and they are produced in astonishing numbers. Darwin (Ann. and Mag. Nat. Hist., ser. 4, vol. iv. p. 158) mentions that it had been calculated that a single plant of *Acropera* probably sometimes produced as many as seventy-four millions of seeds in one year; and Fritz Mueller estimated the number of seeds in one capsule of a *Maxillaria* at 1,756,440!

[2] Groenlund (Botanisk Tidsskrift, 2, iv. p. 57) places the sign of doubt before seven of the species recorded by various authors, and suggests that some of them at least have been wrongly named, or erroneously attributed to Iceland. He is most likely right in some instances; but with regard to *Listera ovata*, which he questions, the specimen authenticated by Paulsen exists in the Kew Herbarium. Martins records seven species from the Færœs.

includes the greatest possible variety of physical conditions. Beginning with Spitzbergen and Nova Zembla, it may seem probable at first that their Arctic climate is too severe for members of the orchid family; yet, when we remember that *Platanthera hyberborea*, *Habenaria albida*, and *Listera cordata* are abundant and luxuriant on Disco Island, Davis Strait, in about 69° 15′ N. lat., climate does not adequately explain the absence of orchids from the two first countries, because the warm oceanic current would more than counterbalance the slight difference in latitude. Then, no fewer than thirteen species of orchids are recorded from Iceland, where also a rigorous climate prevails. Some of the species are extremely rare, however, and it is possible that the order is decreasing in numbers and gradually disappearing from this flora. All the species inhabit Continental Europe, and some of them have also a wide range in the Arctic zone. The Azorean orchids are *Serapias cordigera*, a South European species, and two endemic species of *Habenaria*.

The solitary Bermudan orchid is *Spiranthes tortilis*, a native of Jamaica and Antigua, and a member of the most widely spread genus of the Orchideæ, if we except the somewhat heterogeneous *Habenaria*. *Spiranthes australis* is perhaps the commonest and most widely diffused species of orchid, ranging, as it does, from Afghanistan to Sachalin and Japan, southward to Australia, New Caledonia, and New Zealand.

Altogether there are eight species of orchids in Madeira and the Canaries, whereof three are endemic and the rest Mediterranean.

The four orchids occurring in the Falklands are *Chloræa gaudichaudii*, *Asarca commersonii*, *Asarca odoratissima*, and *Codonorchis lessonii*; the first being apparently endemic, and the others South American.

Socotra has now been pretty thoroughly explored, yet only one orchid, a species of *Habenaria*, has been discovered; but the adjacent countries are also poor in orchids. None has been found at Aden, and the delta and valley of the Nile yield none. One only of the five Rodriguez species is endemic; and only two of the Seychelles species are endemic. Seventy-four species are recorded from the Mauritius.

Turning to the Pacific, the three orchids inhabiting the Sandwich Islands are endemic; they are all three terrestrial, and two of them belong to genera peculiar to the Malayan Archipelago and Polynesia, while the third is a species of the widely spread *Liparis*, and described as intermediate between *Liparis læselii* and *Liparis liliifolia*.

Epidendrum spicatum, and an undetermined orchid, perhaps a species of *Govenia*, collected by Captain Wood, and preserved in the Kew Herbarium, are the only Galapageian orchids at present known. The former is endemic, and the latter insufficient for determination: both genera are otherwise exclusively American. We have seen no orchids from any of the smaller islands of Eastern Polynesia, but there seems to be a fair proportion in the larger—Tahiti, according to Nadeaud, possessing nineteen.

That Juan Fernandez should possess none is surprising, considering the general Chilian affinities of its vegetation.

The number set down for Norfolk Island is probably too low, having been taken from Endlicher's Prodromus (1833). Finally, we come to the New Zealand region, that is to say, New Zealand and the adjacent islands included in Hooker's Handbook of the New Zealand Flora. Eighteen genera and upwards of forty species have been discovered, and two of the genera are endemic, while the rest are also Tasmanian or Australian; none extend to Southern America, the few genera there being distinct and mostly peculiar. With one exception, *Chiloglottis cornuta* in the Auckland Islands, which may yet be found in New Zealand, the orchids found in the Kermadec, Chatham, Auckland, and Campbell Islands, are New Zealand species; a fact pointing to a former land connection. The general distribution of orchids warrants this assumption, for there are comparatively few genera of very wide range, and these, with few exceptions, are the terrestrial genera which have their greatest concentration in the temperate zone of the northern hemisphere. Thus, of the ten orchideous genera represented in California, eight are British, and a ninth, *Calypso borealis*, is also found in Northern Europe and Siberia; while only one is peculiar to America.

THE GENERAL AND INSULAR DISTRIBUTION OF THE GENERA *CAREX* AND *UNCINIA*.

Among large genera especially interesting on account of their insular distribution is *Carex*, comprising about six hundred species, which are, perhaps, more widely dispersed than those of any other genus of flowering plants; and they grow in a very great variety of situations, from the extreme polar limits of vegetation down to the most remote islands, though within the tropics they are almost restricted to the mountains. *Carex*, too, is the only one of the very large and widely dispersed genera that is represented in most of the oceanic islands. *Euphorbia* is represented in Ascension and in many of the Pacific Islands, and *Cyperus* in nearly all of the tropical islands; but *Carex* occurs in a large number of islands, both in the temperate and tropical zones, and in all three of the great oceans. It may be interesting, therefore, to give some more definite particulars of the general distribution of the species. A considerable number of the species are widely spread, some very widely spread; yet in almost all parts where these commoner species penetrate, they are associated with local species. Those growing in the more remote oceanic islands are mostly endemic in single islands or groups of islands. Thus, in the Bermudas, there is one species, which is endemic; in St Helena there are two, both endemic; in the Tristan da Cunha group there are two, both endemic; in Juan Fernandez the only species is endemic; in the Sandwich Islands, three out of six are endemic; and of the twelve species found in the Azores six are endemic, and that, be it remembered, in a flora containing a very small endemic element. On the other hand, the six which inhabit

the Canaries are all widely dispersed species, and the only one recorded from Rodriguez is common in Tropical Asia and Australia.

APPROXIMATE NUMBER OF SPECIES OF CAREX IN VARIOUS ISLANDS AND CONTINENTAL AREAS.

Arctic Regions	37	Abyssinia	5	Campbell Island	2
Greenland	40	Kilimanjaro	3	Chatham Islands	11
Europe	163	Cameroons	5	Norfolk Island	1
Spitzbergen	10	South Africa	12	Isle of Pines, New Caledonia	1
Iceland	32	Levant (Boissier)	93	Aneiteum	1
Sweden	99	Palestine	14	Fijis	3
Norway	102	Arabia	2	Samoa	1
Government of Vologda	34	Persia	12	Philippine Islands	7
Britain	60	Tauro-Caucasus	34	Marianne Islands	2
France	93	India	100	Sandwich Islands	6
Germany and Switzerland	109	Ceylon	16	North America	315
Italy	96	Amur	24	California	78
Maritime Alps	45	Peking	10	British North America	150
Pyrenees	75	Hong-Kong	9	Northern United States	151
Spain	66	Japan	95	Southern United States	80
Portugal	20	Malayan Archipelago	23	West Indies, British	2
Bermudas	1	Rodriguez	1	Cuba	2
Azores	12	Mauritius	5	Mexico and Central America	20
Canaries	6	Madagascar	6	New Granada to Peru and Bolivia	12
St Helena	2	Australia	29	Brazil	5
Tristan da Cunha	2	Queensland	10	Argentine	16
Algeria	30	Australia, West	5	Chili	30
Morocco (Ball)	10	Tasmania	13	Juan Fernandez	1
Egypt	2	New Zealand	40	Falklands	6
Oases	1	Auckland Islands	4		

The general dispersion of the genus *Carex*, together with the fact that the insular species are mostly endemic, seem to indicate that it is a very old type. With the exception of the south-eastern groups of Polynesia (the Society and the Marquesas, for example), the Galapagos, and the small islands in the southern part of the Indian Ocean, *Carices* cover, more or less plentifully, nearly all frigid, temperate, and subtropical areas. The paucity of species in the mountains of the West Indies and in the Andes is remarkable; but what is more singular, several of the common species of the northern hemisphere are found in New Zealand, and nowhere else, so far as we know, in the southern hemisphere. It is noteworthy, too, that some of the insular species are among the larger ones of the genus. *Carex præalta* of St Helena grows six feet high, and is stout in proportion; and *Carex trifida* of New Zealand and the Falklands is a very robust species. The almost equally large genus *Cyperus* is generally diffused in hot countries, and a few species extend into

temperate regions, and there is no doubt that these two genera combined almost cover the whole range of phanerogamic vegetation.

Uncinia, a genus of between twenty and thirty species, differs from *Carex* in the rhachilla protruding from the utricle and being uncinate or glochidiate; and *Carex microglochin*, which is widely dispersed in the northern hemisphere, and recurs in the extreme south of America, is a connecting link between the two; indeed, some botanists refer it to *Uncinia*. The genus *Uncinia* ranges from Australia and New Zealand through the islands in the southern part of the Indian Ocean to Fuegia, and northward along the Andes to Mexico and the West Indies. The parts actually inhabited are Lord Howe's Island, one endemic species; the mountains of Victoria and Tasmania, three species common to both localities; New Zealand, ten species, one of which extends to the Auckland and Campbell Islands, and another to Kerguelen, Amsterdam, and St Paul Islands, while a third is very near, if not the same, as the one species found in the Sandwich Islands. Besides the one New Zealand species found in Amsterdam Island there is another, which also inhabits the Tristan da Cunha group. There are also about ten species in the American region, chiefly concentrated in the extreme south. One species is recorded from the Falklands, but this we have not seen, and there is one endemic species in Juan Fernandez; one ranges from Ecuador to New Grenada, Venezuela, and Jamaica, and another, closely allied to the last, is restricted to Central America and Mexico. This completes the whole area of the genus, for the Abyssinian plant referred to *Uncinia* by Hochstetter is a true *Carex*.

WOODY PLANTS IN OCEANIC ISLANDS.

The preponderance of woody plants in most remote insular floras is undeniable; but that islands "often possess trees or bushes belonging to Orders which elsewhere include only herbaceous species," as stated by Darwin (Origin of Species, p. 392), is incorrect, as may be seen from the following parallels in insular and continental floras. The distribution of arboreous Compositæ is discussed separately.

Sinapidendron (Cruciferæ), from Madeira and Canaries, is represented in Spain and Algeria by much more truly shrubby plants belonging to the genera *Euzomodendron*, *Vella*, and *Oudneya*.

Frankenia portulacæfolia, St Helena, finds a parallel in the Australian *Frankenia pauciflora*, which is shrubby, and sometimes attains a height of three feet.

Alsinidendron and *Schiedea* (Caryophylleæ), Sandwich Islands, cannot be said to have exact counterparts, either continental or insular; but the anomalous *Sphærocoma* of Eastern Africa and Western Asia is also truly shrubby.

Gunnera (Haloragеæ), Juan Fernandez: caulescent species appear to be unknown elsewhere.

Pharnaceum acidum (Ficoideæ), St Helena, is less woody than several of the South African species of the genus.

Bupleurum (Umbelliferæ), Juan Fernandez, has an analogue in the South European *Bupleurum fruticosum;* and the tropical African genera *Steganotænia* and *Heteromorpha* include truly arboreous species, which the Juan Fernandez *Bupleura* are not.

Lobeliaceæ, Sandwich and Society Islands: the endemic genera of this order are represented by equally tall and woody members, belonging to the genera *Centropogon* and *Siphocampylus*, &c., in America.

Echium in the Canaries, *Heliotropium* in St Helena, and *Selkirkia* in Juan Fernandez, belonging to the Borragineæ, are represented in South Africa by many truly shrubby species of *Lobostemon*.

Cuminia (Labiatæ), Juan Fernandez: the species of this genus are surpassed in size by the South American *Hyptis membranacea*, which grows thirty to forty feet high, and equalled by *Hyptis arborea* from the same country; and there are many large shrubby and subarboreous Labiatæ in Australia and India.

Plantago: the St Helena, Juan Fernandez, and Sandwich Islands species of this genus are unapproached in their character of miniature trees, with an unbranched stem, by any continental species that we have seen; yet some of the South American species are woody. Wawra (Flora, 1874, p. 563) states that the stem of the Sandwich Island *Plantago princeps* is sometimes as much as six feet high.

So far, then, as these insular woody plants are concerned, and the same holds good for the arboreous Compositæ, which constitute so prominent a feature in the vegetation of several oceanic islands, they cannot be regarded as peculiarly insular, though they largely characterise insular floras. Instances of shrubby and arboreous species of orders, or of large genera otherwise herbaceous or shrubby, are not wanting in larger islands and continents. The shrubby Veronicas of New Zealand culminate in *Veronica elliptica*, Forst., which is arboreous in favourable situations, attaining a height of twenty feet; and, what is more remarkable, this species inhabits New Zealand, the Chatham, Auckland, and Campbell Islands, and South Chili, Fuegia, and the Falkland Islands. This, however, is not adduced as a special instance. In Chili there is the shrubby *Oxalis gigantea*, which grows three to six feet high, and there are several shrubby species of *Viola;* but the localities where they grow are probably as insular in their physical conditions, except isolation, as the islands themselves.

INDIGENOUS AND ENDEMIC GENERA AND SPECIES OF FLOWERING PLANTS IN VARIOUS ISLANDS AND CONTINENTAL AREAS.

The vegetation of some of the remote oceanic islands is remarkable for the large number of endemic genera and species it contains, but not more so than that of some

continental areas, especially in the southern hemisphere. The following statistics illustrate this point:—

	Genera.		Species.	
	Indigenous.	Endemic.	Indigenous.	Endemic.
Aden	79	1	94	14
Amsterdam Island	12	0	16	4
Arctic Regions	220	1	770	8
Ascension[1]	8	0	8	2
Auckland Island[2]	57	0	85	8
Australia[3]	1393	425	8800	7550
Australia, West	...	100	3136	2680
Azores[4]	249	0	478	40
Bermudas[5]	97	0	120	4
Campbell Island	42	0	61	3
Canaries	...	15	977	269
Chatham Island	56	1	62	9
Crozets	5	0	5	0
Cuba	...	...	2984	929
Falklands	84	0	115	26
Fernando-Noronha	48	0	58	5
Heard Island[6]	4	0	4	0
Galapagos[7]	164	7	332	174
Iceland[8]	175	0	433	0
Japan	1035	48	2743	...
Juan Fernandez	46	10	102	70
Kerguelen	18	1	21	3
Macquarie	13	0	16	0
Madeira	...	...	648	103
Marion	7	0	8	0
Mauritius	...	...	705	195
New Zealand[9]	303	28	935	677
Philippine Islands	1002	7	3466	915
Rodriguez	119	3	176	36
St Paul	8	0	10	3
St Helena[10]	44	5	62	38
Sandwich	253	39	512	376
Seychelles	180	7	258	52
Socotra	324	16	600	200
Spitzbergen	54	0	116	0
Tasmania	394	22	1063	267
Trinidad, South	9	0	9	3
Tristan da Cunha	23	0	29	15
West Indies[11]	...	...	4401	2155

[1] This number is probably too high, for possibly only two species are indigenous: see remarks, Part II., pp. 31–34.

[2] *Pleurophyllum*, a genus of Compositæ, is restricted to the Campbell, Auckland, and Macquarie Islands.

[3] These numbers are taken from Baron Mueller's Lecture on the Flora of Australia, 1882, and include the vascular cryptogams. He there (p. 11) states that there are 550 genera in Australia, represented by only one species each, and 160 of these genera are monotypic and endemic in Australia.

[4] The endemic species comprise several seggregate or critical ones; and the number of genera is considerably in excess of what it would be on the basis of Hooker and Bentham's Genera Plantarum.

[5] The endemic species are very closely allied to continental ones.

The figures in this table are, of course, in many instances, merely rough approximations, and they are not all based on one generic standard; still, they are sufficiently near the truth to give some idea of the proportions. Several of them are taken from Engler's Versuch einer Entwicklungsgeschichte der Pflanzenwelt, and the others which are not our own are taken from the various works enumerated in the Bibliography, p. 71. Unfortunately, there are few published statistics relating to large continental areas. It is clear, however, that the endemic element is equally as high in certain continental areas as it is in any of the oceanic islands. Even if we reduce the indigenous element of the flora of St Helena to the endemic species, and that would be going too far, there would be only five endemic genera out of twenty-seven. In Juan Fernandez the proportions, after deducting several genera, which are probably indigenous, are ten out of forty-six; in the Sandwich Islands thirty-nine out of 253, and in the Galapagos seven out of 164. In the larger islands of New Zealand these proportions are unequalled, while in Australia the endemic genera amount to considerably more than a quarter of the whole, the exact proportion being 30·5 per cent. In Madagascar, Mr J. G. Baker informs us, out of about 730 genera of flowering plants known to be represented in the island, about 100, or 13·7 per cent., are endemic. In Extratropical South Africa, the proportion of endemic genera is certainly not quite so high as in Australia, for many of the genera which add largely to the total of endemic species, such as *Pelargonium*, *Oxalis*, *Phylica*, *Mesembryanthemum*, *Erica*, and *Gladiolus*, have a wider distribution. On the other hand, the proportion is much higher than in Madagascar, so far as the flora of the latter has been investigated. Engler (*loc. cit.*, p. 190) gives the number of endemic dicotyledonous genera in Brazil as 215, with 124 more restricted to North Brazil, Guiana, and Venezuela. This is a large proportion; but the figures are not available for comparison, because we do not know the total number of genera represented in Brazil. Taking the whole of Tropical America, there are, according to the same authority (p. 173), 1448 genera of dicotyledons; and the

[6] Taken in conjunction with Marion, the Crozets, and Kerguelen, this little flora comprises twenty-one species of flowering plants belonging to eighteen genera, two of which are endemic; and six of the species are endemic.

[7] Five of the reputed endemic genera since reduced in Bentham and Hooker's Genera Plantarum.

[8] The latest enumeration of Iceland plants is by Groenlund (Botanisk Tidsskrift, 2, iv. p. 36), who admits 317 flowering plants, and places a note of interrogation before all the names of plants of which he had no authentic specimens.

[9] A few additional genera and species have been described since the publication of Hooker's Handbook, from which these figures were taken. Engler's numbers for New Zealand, including vascular cryptogams, are:—Genera, 343, of which 20 are endemic [but a species of *Carmichaelia* has since been found in Lord Howe's Island; therefore, 19], and 1094 species, of which 671 are endemic.

[10] The total numbers of genera and species are probably too high: see remarks, Part II., p. 55.

[11] The number of dicotyledonous genera, according to Grisebach's computation, was 1030, comprising 1789 endemic species belonging to 540 genera, and 1866 not endemic species belonging to 763 genera. Of the total number of endemic species given in the table, 849 are peculiar to Cuba, 275 to Jamaica, Trinidad 83, Dominica 29, and St Vincent 12, the other smaller islands being almost destitute of endemic species.

total endemic genera for the different areas of Tropical America is 622 (p. 190). Adding to this number the genera extending to two or more of the areas, but not beyond Tropical America, the proportion of endemic genera must be even higher than in Australia.

With regard to the proportion of endemic species in oceanic islands compared with continental areas, it will be seen that it is higher in Australia, and doubtless as high in South Africa and in some parts of South America, as well as in Mexico.

PROPORTION OF MONOTYPIC ENDEMIC GENERA TO THE TOTAL ENDEMIC GENERA IN VARIOUS ISLANDS AND CONTINENTAL AREAS.

The following are the monotypic endemic genera in the remote oceanic islands dealt with in this work: *Nesiota*, *Petrobium*, and *Mellissia* in St Helena; *Pringlea* in the chain, if we may so term it, of islands, from the Prince Edward group to the Macdonald group; *Lyallia* in Kerguelen only; and *Rhetinodendron*, *Selkirkia*, *Lactoris*, *Ochagavia*, *Juania*, *Pantathera*, and *Podophorus* in Juan Fernandez: the total endemic genera being respectively five, two, and ten. For comparison, we extract from Engler (*loc. cit.*, p. 133) some particulars of the proportions in various other parts of the world, intercalating our own; limited, however, to the dicotyledons:—

Country.	Total Endemic Genera.	Monotypic Endemic Genera.	Percentage of Monotypic Endemic Genera.
Marion to Heard Island	2	2	100 per cent.
Japan	48	43	89 ,,
Ceylon	21	18	86 ,,
New Zealand	22	17	77 ,,
Fiji Islands	13	10	77 ,,
Chili	64	44	69 ,,
Madagascar	91	59	65 ,,
East Australia	151	92	61 ,,
St Helena	5	3	60 ,,
New Caledonia	38	18	47 ,,
Mascarene Islands	34	16	47 ,,
West Australia	99	45	45 ,,
Sandwich Islands	32	10	31 ,,
Juan Fernandez[1]	10	3	30 ,,

The percentages of monotypic genera for East Australia and New Caledonia are given by Engler as 65 and 47 respectively, evidently through some clerical error. The five Japanese endemic genera which are not monotypic are all ditypic; while eleven of the New Caledonian and sixteen of the Madagascar endemic genera are also ditypic.

[1] Adding the monocotyledons the percentage rises to 70.

ORDERS, GENERA, AND SPECIES OF VERY RESTRICTED AREAS.

For purposes of comparison, a few particulars concerning some continental types of different grades of very restricted areas may be introduced here, if only to show that, from some cause or causes, such exist. We have not space to discuss the possible causes, but it is probable that these types are either dying out or are of comparatively recent origin. From the particulars given below, it appears that inability to produce abundance of good seed is not the cause, in some cases at least.

ORDERS RESTRICTED TO ONE CONTINENTAL AREA.

The number of Natural Orders restricted to one region or one continent is considerable even as the orders are circumscribed in Bentham and Hooker's Genera Plantarum; and taken in the more limited sense adopted by De Candolle (Géographie Botanique, p. 1158), the number would be about double. Thus, taking the former work as a basis, the Tremandreæ are peculiar to Australia; the Vochysiaceæ to Tropical America; the Chlænaceæ to Madagascar; the Cactaceæ (except *Rhipsalis*) to America; the Calycereæ to Extratropical South America; the Bruniaceæ to South Africa; the Nepenthaceæ to the tropics of the Old World, excluding continental Africa; the Bromeliaceæ to America, the Mayaceæ to America, the Cyclanthaceæ to Tropical America; but the number peculiar to smaller areas is barely half-a-dozen, and, as might be expected, they comprise very few genera and species. Moreover, some of them have perhaps less claim to rank as independent orders than some groups that are reduced to suborders or tribes, and no more claim to the same rank than some of the anomalous genera; but as connecting links are wanting they are given the superior rank. There is one such order, the Balanopseæ, restricted to New Caledonia, and consisting, as far as at present known, of one genus and six or seven species. Another order, the Leitnerieæ, comprising only one genus and two species, is peculiar to Florida and Texas. The Columelliaceæ, one genus and two species, are restricted to the Andes of Ecuador and Peru; while the singular Lennoaceæ, consisting of three genera and four or five species, inhabit only Mexico and California. Another small order, the Rapateaceæ, consisting of five genera and about twenty species, is limited to Guiana and Tropical Brazil. As an instance of a small order occupying distant, separated areas, the Sarraceniaceæ may be named. This order comprises three genera: *Sarracenia*, of which there are several species inhabiting Eastern North America; *Darlingtonia*, a monotypic genus inhabiting the mountains of California; and *Heliamphora*, also monotypic, which is only known from the mountains of British Guiana.

DISTINCT CONTINENTAL GENERA OF VERY RESTRICTED AREAS.

There are probably scores, or even hundreds, of monotypic continental genera confined to very small areas; perhaps not very many to such small areas as St Helena or Juan Fernandez, or the islands of the Sandwich, Galapagos, or Seychelles groups; but, nevertheless, many very distinct genera have hitherto only been met with in one locality or district, especially continental genera of the southern hemisphere. Of course we cannot assume that they do not exist in more than one district because they have hitherto not been found elsewhere. De Candolle (Géographie Botanique, p. 1141), in giving examples of genera of very wide and very limited areas, cites insular genera only of the latter category. In the absence of more exact information we can give examples of a few genera which appear to be comparatively local. Whether, like the eastern Asiatic *Ginkgo* (*Salisburia*), and the North American *Sequoia*, they are survivors of types having a much wider distribution during the tertiary period, is a question that we can only suggest. *Darlingtonia* and *Heliamphora* (Sarraceniaceæ, cited on p. 36 as an example of an order of discontinuous area) are instances of highly differentiated monotypic genera of a very curious order, apparently of comparatively local existence, though the former ranges from the Truckee Pass to the borders of Oregon. It is singular, too, that some other of the so-called carnivorous genera of plants are very local. Thus, *Dionæa* is confined to North Carolina and the adjacent parts of South Carolina. The Hamamelideæ, also a very remarkable order, comprise a number of monotypic genera, several of which are at present only known from single localities or narrowly limited districts; and none of them, except Liquidambar, has anything approaching a wide range. This genus now occupies several widely separated areas in North America, Asia Minor, and the extreme Eastern Asia; but during the tertiary epoch it inhabited the intervening country. The Begoniaceæ consist of the very large genus *Begonia*, which is widely spread in warm countries of both hemispheres, and one very small very distinct genus, *Begoniella*, which inhabits the Andes, and the monotypic *Hillebrandia*, a native of the Sandwich Islands. *Columellia*, mentioned at p. 36, has a restricted range in the Andes; *Gosela* (Selagineæ) is a monotypic South African genus of apparently very restricted area; *Atkinsonia* (Loranthaceæ) is only known from the Blue Mountains in New South Wales; and *Saprium* (Cytinaceæ) has only been gathered in one place in Eastern Bengal. The number of monotypic genera of Orchideæ, known from only one locality, is considerable, but it is hardly worth while giving a list of names. *Lapiedra* and *Tapeinanthus* (Amaryllideæ) are instances of European local genera, the former being found only in Southern Spain, and the latter in Southern Spain and Tangiers. Finally, the distribution of the Burmanniaceæ is interesting in this connection. *Burmannia* itself is spread nearly all over the tropics, and *Gymnosiphon* is represented in America, Africa, and the Malayan Archipelago; while several others which exhibit some marvellous deviations

in the forms of their flowers, such as *Bagnisia* (New Guinea), *Geomitra* (Borneo and Java), *Corsia* (New Guinea), and *Arachnites* (Chili), are apparently local or very local. In conclusion, one or two examples of genera represented by the same species in widely separated areas may be given: *Diphylleia*, a genus of Berberidaceæ, regarded by Dr A. Gray and other botanists as monotypic, inhabits Japan and Virginia and North Carolina. The eastern Asiatic plant has, however, been described as an independent species. *Colcanthus*, a genus of grasses, is another monotype inhabiting widely separated areas, having been found in France, Bohemia, and Norway, and also recently in Sauvies Island, in the mouth of the Oregon river, North-west America. In this instance there is no question of the identity of the species.

DISTINCT CONTINENTAL SPECIES OF VERY RESTRICTED AREAS.

From what has been said in the paragraphs on orders and genera of very restricted areas, it follows that the number of continental species found in single localities or districts is large, amounting perhaps to thousands. Therefore it will be sufficient to name a few well-authenticated instances of such plants in order to demonstrate that very local species are not peculiar to oceanic islands, and that some plants are unable from some cause or causes to extend their areas, though able to hold their ground in certain localities.

Hudsonia montana, Nutt.; Chapman, Fl. Southern U.S., p. 36.—A very small-flowered, very small shrubby member of the Cistineæ, found only on Table Rock, North Carolina. The genus comprises three species restricted to the eastern maritime states of North America.

Neviusa alabamensis, A. Gr. in Mem. Amer. Acad. Sci., N.S. vi. p. 374; Bot. Mag., t. 6806.—A member of the Rosaceæ, hitherto only found near Tuscaloosa, in Alabama. It is the only species of the genus, and might, therefore, also figure as an example of a continental genus of very restricted area.

Saxifraga florulenta, Moretti, Tent. Saxif., p. 9; Bot. Mag., t. 6102; Regel, Gartenflora, 1874, pp. 2 et 314, t. 782.—This very distinct and striking species is very local, yet not uncommon within its limited area. Sir J. D. Hooker (Bot. Mag., *loc. cit.*) states that it was first discovered in the Alps of Fenestre, about the year 1820, by an English tourist; and he says it appears to be tolerably abundant at an altitude of from 7000 to 9000 feet within an area of about eight square miles, in the Maritime Alps, between the Col di Tenda and the valley of the Tinea, north of Nice, but is not found elsewhere.

Dionæa muscipula, Ellis; Chapman, Fl. Southern U.S., p. 37; Bot. Mag., t. 785.—This and the next are given as examples of genera of restricted area. North and South Carolina.

Rhodoleia championi, Hook., Bot. Mag., t. 4509.—In the paragraph on genera of very restricted areas, special mention is made of the local character of several of the

monotypic genera of the Hamamelideæ, of which this is a member, and the most showy one of the order, being as conspicuous as a Camellia; yet it has hitherto, we believe, been found in a wild state only in the island of Hong-Kong. This island being within half a mile of the mainland is practically continental.

Campanula isophylla, Moretti; App. Schouw., Fl. Ital., p. 22; Bot. Mag., t. 5745; Moggridge, Contrib. Fl. Ment., t. 80.—Like *Saxifraga florulenta*, this is a striking plant, and even showy when in flower. According to Moggridge, the latest authority, this is only known to grow along the small strip of coast, about two and a half miles in length, from the promontory of Caprazoppa to near the little town of Noli. The same author says it is difficult to account for the restricted area, because it produces large quantities of seed, which germinates freely, and is so minute as to be easily transported by winds, or by adhering to the feet of small birds when wetted by hopping in dewy grass, &c.

Lithospermum gastoni, Benth. in DC. Prodr., x. p. 83; Bot. Mag., t. 5926; Regel, Gartenflora, 1874, t. 812.—A conspicuous species first discovered at the Pic de Gers in 1839, and since collected at the Pic d'Anie and Col de Tartes, all in the Basses Pyrenees.

Leucojum hiemale, DC., Fl. Franc. Suppl., p. 326, var. *a*; Bot. Mag., t. 6711; Moggridge, Contr. Fl. Ment., t. 21.—This pretty and distinct species of snowflake is only known in a wild state on a small strip of rocky shore reaching from Nice to about two miles east of Mentone.

Galanthus olgæ, Orphanides; Boiss., Fl. Or., v. p. 144.—Only recorded from Mount Taygetus in Greece; and there are one or two other species equally local.

Dioscorea pyrenaica, Bubani et Bordère in Bull. Soc. Bot. France, xiii. p. 382, t. 1.—This remarkable plant inhabits the Central and Eastern Pyrenees of Spain, and is equally or even more interesting on account of its isolation from the rest of the genus than as a species of very restricted area. The genus *Dioscorea* numbers about 150 species, generally spread over tropical countries, and a few inhabiting temperate regions in Eastern Asia, North and South America, and South Africa; but the present species is the only one in Europe, and there is none in Northern Africa nor in Western Asia, nor indeed within the limits of Boissier's Flora Orientalis. In habit it is nearest to Mexican and Chilian species.

DO INSULAR TYPES OF THE VEGETABLE KINGDOM EXHIBIT ANY VERY SPECIAL STRUCTURAL OR OTHER PECULIARITIES IN THEIR FLOWERS?

We have shown that the physiognomical characteristics of insular vegetation are repeated in continental countries, and also, that there are continental genera and species equally as local in their habitats as the insular ones; but, generally speaking, the physical conditions, excepting the insularity, are very similar in the two cases.

With regard to the size, shape, colour, and structure of the flowers of the endemic

plants of oceanic islands, the question arises, Do they present any peculiarities? Let us examine the endemic element of the St Helena flowering plants. Firstly, with regard to size: taking order by order and genus by genus, the flowers or flower-heads, as the case may be, will be found rather above than below the average of the order or genus. Excluding the Cyperaceæ and Gramineæ, there are thirty endemic flowering plants, and for purposes of comparison it may be worth giving the size, and colour, and structure of their flowers or flower-heads in a tabular form, premising that they offer no abnormalities in shape. The coloured figures in Melliss's St Helena have been utilised for size and colour.

SIZE AND COLOUR OF THE FLOWERS OF THE ENDEMIC PLANTS OF ST HELENA, WITH REMARKS ON STRUCTURE, &c.

Name.	Size of Flowers or Flower-heads.	Colour.	Peculiarity in Structure.
Frankenia portulacæfolia	¼ in. across	White	Dimerous ovary.
Melhania melanoxylon	3 ins. across	White changing to red	Habit of *Trochetia*, with structure of *Melhania*.
„ *erythroxylon*	2½ ins. long	White changing to red	
Pelargonium cotyledonis	1 in. across	White	Normal.
Phylica ramosissima	Minute	Greenish yellow	Normal.
Nesiota elliptica	Small	Reddish	Differs from *Phylica* in opposite leaves and larger corymbose flowers.
Mesembryanthemum cryptanthum	¼ in. across	White	Petals shorter than calyx.
Pharnaceum acidum	1 in. across.	White	Unequal sepals and entire stipules.
Sium burchellii	Small	White	Normal.
„ *helenianum*	Small	White	Normal.
Hedyotis arborea	Small	White	Short rotate corolla.
Commidendron burchellii	½ in. across	White and yellow	Achenes compressed with three or four ribs on each side.
„ *spurium*	¼ in. across	White and yellow	
„ *robustum*	⅜ in. across	Yellow	
„ *rugosum*	1½ in. across	White and yellow	
Melanodendron integrifolium	1 in. across	White and yellow	Achenes 3–5-ribbed.
Petrobium arboreum	½ in. across	White	Biaristate pappus.
Psiadia rotundifolia	Small	White	Normal.
Senecio leucadendron	¼ in. across	White and yellow	Erect inflorescence of small flower-heads.
„ *prenanthiflora*	Very small	White	Pendulous inflorescence of very narrow heads.
Tripteris burchellii	⅜ in. across	Yellow	Normal.
Lobelia scævolæfolia	⅜ in. across	White	Normal.
Wahlenbergia angustifolia	1 in. across	White, very faintly tinged with blue	Normal.
„ *linifolia*	1¼ in. long	White	Normal.
„ *roxburghii*	¾ in. long	White	Normal.
„ *burchellii*	⅜ in. long	White	Normal.
Plantago robusta	Minute	Green	Normal.
Heliotropium pannifolium	Small	Whitish	Normal.
Mellissia begonifolia	⅜ in. across	White	Differs from *Saracha* in solitary flowers.
Acalypha rosea	Minute	Red	Very long slender pendulous flower-spikes.

As already stated, the size of the flowers or flower-heads of the St Helena indigenous plants is on the whole rather above than below the average of those of their allies in other parts of the world. When we come to colour, however, the equality fails altogether, red being almost entirely wanting in the insular plants and blue unknown; for the slight tinge of blue in Melliss's figure of *Wahlenbergia angustifolia* seems to have been added to show the flowers on the white ground. Burchell describes (MSS. in Bibl. Kew) the flowers of all the St Helena species of *Wahlenbergia* as white. The species of *Melhania*, like those of many allied plants, change in colour after expansion. At first they are pure white, becoming pink or brown red according to Melliss, who, however, represents them with a clear, rosy red. Of no other oceanic island are we able to give such full particulars on this point; but it may be asserted that brilliantly coloured flowers are very rare in such situations.[1] Brigham (Proceedings of the Boston Natural History Society, xii. p. 6) says: "There are but few show-flowers, and still fewer fragrant ones, in the Hawaiian Flora. In the colouring white or greenish white is predominant, and yellow and pink follow at a respectful distance. There are very few blue flowers. *Strongylodon lucidum* is a rich crimson, and some other leguminous plants are violet, but the various and brilliant colouring of the Californian plants is wholly absent."

The flora of Juan Fernandez partakes, however, in some measure of the generally more brilliant colouring of the flowers of the south temperate zone. Indeed, Philippi states (Botanische Zeitung, 1856, p. 635) that the Juan Fernandez species of Chilian genera are handsomer, and especially larger-flowered, than their continental congeners.

Returning to the question of the existence of structural peculiarities in insular plants, we may safely say that no general ones exist, and the very distinct genera that occur are not disproportionate. Not a single order, or suborder, or tribe, is endemic in the smaller oceanic islands; and, as more fully set forth elsewhere, the greatest isolation of an order is that of the Balanopseæ in New Caledonia. The endemic genera of St Helena present no anomalies, nor indeed any specially striking differentiations in structure; for it is habit rather than structure that characterises the Compositæ. In the Tristan da Cunha group, and in St Paul and Amsterdam, the endemic element includes no higher rank than species. The other islands in the Southern Indian Ocean which have essentially the same flora (see Part II., p. 251) possess two very distinct, though by no means anomalous genera, namely, *Pringlea* and *Lyallia*. In the Juan Fernandez *Lactoris* we have an example of a truly anomalous genus, the position of which in the natural system is not evident.

The most highly differentiated endemic genera of the Sandwich Islands flora are: *Schiedea* and *Alsinidendron*, shrubby Caryophylleæ exhibiting important structural

[1] In relation to the fertilisation of plants by insects, the absence of native butterflies in St Helena is noteworthy. On this point Melliss (St Helena, p. 180) says: "The varied hues of the St Helena landscape need little to add to their brilliancy [brilliant with exotic plants], or the almost entire absence of butterflies would be more striking. There are but four species in the island, and they have all been imported. With moths it is different: they abound."

peculiarities; *Platydesma*, Rutaceæ; *Hesperomannia*, the only Composite of the sub-order Mutisiaceæ known from the Pacific Islands; *Rollandia*, *Delissea*, *Clermontia*, and *Brighamia*, shrubby and subarboreous Lobeliaceæ; and *Phyllostegia* and *Stenogyne*, herbaceous Labiatæ.

The principal endemic peculiarities of the Seychelles, and other islands in the tropical parts of the Indian Ocean, have been pointed out on p. 11; but there are two or three other remarkable genera deserving of mention, namely, *Roussea*, an anomalous genus of Saxifrageæ, inhabiting Mauritius and Bourbon; the Rodriguez endemic *Mathurina*, an arboreous member of the Turneraceæ, which is described as being most nearly related to *Erblichia*, a monotypic genus native of Panama; and *Dendrosicyos*, an arboreous Cucurbitacea, known only from the island of Socotra.

DISPERSAL OF PLANTS BY OCEANIC CURRENTS AND BIRDS.

In Part III., pp. 277–313, we have brought together all the evidence we have been able to find on the dispersal of plants by oceanic currents and birds, and we have little to add here; but we have drawn up lists of plants which are certainly or probably transported by these agencies. The first, which consists of plants probably dispersed by oceanic currents, is partly derived from the collections of drifted and stranded seeds which we have examined, and partly from other sources; a certain number of widely dispersed littoral plants having been added on the assumption that their present distribution could be accounted for in no other way, and further observation will doubtless greatly augment this list. Among the drift-seeds were many which probably rarely if ever survive long immersion in the sea, and these are not included.

PLANTS CERTAINLY OR PROBABLY DISPERSED BY OCEANIC CURRENTS.

MENISPERMACEÆ.
Cissampelos pareira.

CRUCIFERÆ.
Lepidium piscidium?

BIXINEÆ.
Pangium edule.

PORTULACEÆ.
Portulaca oleracea.

GUTTIFERÆ.
Calophyllum inophyllum.
„ *calaba.*

MALVACEÆ.
Hibiscus tiliaceus.
Hibiscus sp.
Thespesia populnea.

STERCULIACEÆ.
Sterculia.
Heritiera littoralis.

TILIACEÆ.
Triumfetta?

SIMARUBEÆ.
Suriana maritima.

OCHNACEÆ.
Brackenridgea.

MELIACEÆ.
Carapa moluccensis.
„ *guyanensis.*

OLACINEÆ.
Gomphandra.

RHAMNACEÆ.

Alphitonia.
Smythea.
Colubrina asiatica?

AMPELIDEÆ.

Leea.
Vitis.

SAPINDACEÆ.

Sapindus saponaria.
Harpullia.
Dodonæa?

ANACARDIACEÆ.

Anacardium occidentale.
Dracontomelon.
Spondias.

LEGUMINOSÆ.

Pongamia glabra.
Pterocarpus.
Canavalia obtusifolia.
Entada scandens.
Mucuna priuriens.
„ *urens.*
Tephrosia piscatoria.
„ *purpurea.*
Sesbania grandiflora.
„ *aculeata.*
Erythrina.
Dioclea reflexa.
Inocarpus.
Adenanthera pavonina.
Drepanocarpus lunatus.
Ecastaphyllum brownei.
Desmodium umbellatum.
Vigna lutea.
„ *luteola.*
Derris uliginosa.
Cassia sophera.
„ *fistula.*
Acacia farnesiana.
Cæsalpinia nuga.
„ *bonduc.*
„ *bonducella.*

ROSACEÆ.

Chrysobalanus icaco.
Parinarum.

RHIZOPHOREÆ.

Rhizophora mangle.
„ *mucronata.*
Bruguiera rheedii.

COMBRETACEÆ.

Terminalia.
Gyrocarpus jacquini.
Lumnitzera coccinea.

MYRTACEÆ.

Barringtonia speciosa.

MELASTOMACEÆ.

Melastoma denticulatum.

LYTHRARIEÆ.

Sonneratia.
Pemphis acidula.

CUCURBITACEÆ.

Fevillea cordifolia.

FICOIDEÆ.

Sesuvium portulacastrum.

RUBIACEÆ.

Guettarda speciosa.
Mussœnda frondosa?
Morinda citrifolia.

COMPOSITÆ?

LOBELIACEÆ.

Scævola kœnigii.
„ *lobelia.*

APOCYNACEÆ.

Ochrosia parviflora.
Ochrosia sp.
Cerbera odollam.
Tabernæmontana.
Plumeria.

BORAGINEÆ.

Cordia subcordata.
Tournefortia argentea.
Heliotropium.

CONVOLVULACEÆ.

Batatas paniculata.
Ipomœa biloba
(*Ipomœa pes-caprœ*).
Ipomœa spp.

VERBENACEÆ.
Vitex.
Avicennia.

NYCTAGINEÆ.
Boerhaavia diffusa.
Pisonia aculeata.

AMARANTACEÆ.
Alternanthera achyrantha.
Iresine vermicularis.
„ *aggregata.*
Telanthera frutescens.
„ *maritima.*

CHENOPODIACEÆ.
Salsola kali.

LAURINEÆ.
Cassytha?

EUPHORBIACEÆ.
Euphorbia atoto.
Hernandia sonora.
Aleurites moluccana.
Ricinus communis.
Omphalea diandra.

JUGLANDACEÆ.
Juglans?

CASUARINEÆ.
Casuarina equisetifolia.

GNETACEÆ.
Gnetum rumphianum.

CYCADACEÆ.
Cycas.

ORCHIDEÆ.

SCITAMINEÆ.

AMARYLLIDEÆ.
Crinum asiaticum.

TACCACEÆ.
Tacca?

LILIACEÆ.
Dianella ensifolia.

COMMELINACEÆ.
Commelina nudiflora.

PALMÆ.
Cocos nucifera.
Manicaria?
Nipa fruticans.
Orania.
Sagus (*Metroxylon*).

PANDANACEÆ.
Pandanus.

CYPERACEÆ.
Cyperus.
Remirea maritima.

GRAMINEÆ.
Stenotaphrum americanum.
Sporobolus virginicus.
Imperata arundinaceæ.
Lepturus.
Panicum?

PLANTS PROBABLY DISPERSED BY BIRDS.

The number of plants locally dispersed by birds is undoubtedly very large; and the perfectly sound seeds ejected from the crops of carpophagous birds, which fly long distances, prove the possibility of their being active agents in transporting seeds to distant, or even perhaps very rarely indeed to remote shores. In Polynesia, for example, it is very probable that birds have played an important part in conveying certain seeds from island to island; but that birds ever carry seeds uninjured the enormous distances suggested by Dr Guppy, for instance, seems to us improbable.

On this point we find the following note by Mr Moseley in Wallace's Island Life, p. 250: "Grisebach, Vegetation der Erde, ii. p. 496, lays much stress on the wide ranging of the Albatross (*Diomedea*) across the equator from Cape Horn to the Kurile

Islands, and thinks that the presence of the same plants in Arctic and Antarctic regions may be accounted for possibly by this fact. "I was much struck at Marion Island of the Prince Edward group by observing that the great albatross[1] breeds in the midst of a dense low herbage, and constructs its nest of a mound of turf and herbage. Some of the indigenous plants, *e.g.*, *Acæna*, have flower-heads [fruits], which stick like burrs to feathers, &c., and seem specially adapted for transportation by birds. Besides the albatrosses, various species of *Procellaria* and *Puffinus*, birds which range over immense distances, may, I think, have played a great part in the distribution of plants, and especially account, in some measure, for the otherwise difficult fact (when occurring within the tropics) that widely distant islands have similar mountain plants. The *Procellaria* and *Puffinus* in nesting burrow in the ground, as far as I have seen, choosing often places where the vegetation is thickest. The birds in burrowing get their feathers covered with vegetable mould, which must include spores and often seeds. In high latitudes, the birds often burrow near the sea-level, as at Tristan da Cunha and Kerguelen Islands, but in the tropics they choose the mountains for their nesting-place (Finsch and Hartlaub, Ornithologie der Viti- und Tonga- Inseln, 1867, Einleitung, p. 18). Thus *Puffinus megasi* nests at the top of the Korobasa Basaga Mountain, Viti Leon, fifty miles from the sea. A *Procellaria* breeds in like manner in the high mountains of Jamaica, I believe, at 7000 feet. Peale describes the same habit of *Procellaria rostrata* at Tahiti, and I saw the burrows myself amidst a dense growth of fern, &c., at 4400 feet elevation in that island. *Phæthon* has a similar habit. It nests at the crater of Kilauea, Hawaii, at 4000 feet elevation, and also high up in Tahiti. In order to account for the transportation of the plants, it is not of course necessary that the same species of *Procellaria* or *Diomedea* should now range between the distant points where the plants occur. The ancestor of the now differing species might have carried the seeds. The range of the genus is sufficient."

We have already alluded (Part III., p. 313) to Dr Guppy's assumption that it is possible that a seed might be transported by a bird from South Trinidad in the Atlantic to Amsterdam Island in the Indian Ocean. In connection with this, he mentions having found a small hard seed in the gizzard of a Cape pigeon, or Cape petrel, *Daption capensis*, taken about 550 miles east of Tristan da Cunha; a species of bird which he observed a little southward of South Trinidad, and traced as far as Amsterdam Island.

Mr John Murray (*in litt.*) mentions that when birds break their eggs, the matter often hardens on their feet and plumage, and he has seen seeds and small sticks embedded in it; but this happens at a season when birds are unlikely to fly long distances.

From the small collections of seeds and fruits taken from the crops of pigeons by Mr Moseley and Dr Guppy, plants of the following genera or species are known to be dispersed by birds in Polynesia: *Oncocarpus vitiensis*, *Elæocarpus* spp., *Soulamea*

[1] See Narr. Chall. Exp., p. 294, 1885.

amara, Ximenia americana, Eugenia, Psychotria, Premna? Cassytha filiformis, Laurineæ various (including *Litsea*), *Myristica, Phyllanthus, Ficus, Gnetum, Clinogyne grandis, Areca, Kentia,* and *Orania.*

This is a very small list, and is merely offered as an example of what is done by birds. As Dr Beccari, Mr Moseley, and others have pointed out, the fruit-pigeons are able to swallow much larger fruits than would seem possible; and the cassowaries of New Guinea, on the authority of the former, swallow the fruits of *Orania aruensis,* which are two inches and a half in diameter.

EXAMPLE OF AN ISLAND WHICH HAS BEEN LARGELY FURNISHED WITH PLANTS BY OCEANIC CURRENTS AND BIRDS.

In his notes on the vegetation of the Admiralty Islands (reproduced in Part III., pp. 227–231), Mr Moseley gives some particulars of the means by which newly raised coral islands become stocked with plants, and the kinds of trees which successively follow each other. Dr Guppy, too (see Part III., p. 309), and Dr Beccari (*loc. cit.,* p. 312), contribute some interesting facts in relation to the process; and with the evidence we have collected from other sources before us, there is no difficulty in drawing a complete picture of the various phases in the production of an insular flora, such as that of the Arrou or Admiralty Islands, for example. The lists given above might be extended considerably on the assumption that if such and such plants owe their present distribution to these agencies, numerous other plants bearing similar seeds or fruits were dispersed in the same way; but there is no need for speculation, as the evidence is sufficient to account for the vegetation of most of the islands, except those placed in our first category (p. 6), and characterised by having a large endemic element including generic types. From the positions of these islands, it is improbable that birds have effected much, if anything, in stocking them with plants; and the littoral element is almost entirely wanting, in consequence of the nature of the shores being such as to render it impossible for plants to establish themselves thereon.

Taking a very small selection of flowering plants, whose seeds are transported by oceanic currents and birds, we may trace the gradual invasion of an island by herbs, shrubs, and trees. Actual evidence of the germination of drifted grass seeds is wanting, and most of the drift-seeds that certainly retain their vitality, as explained before, are either exalbuminous or have oily albumen; but Darwin's experiments proved that many seeds having farinaceous albumen—those of the oat, for example, will bear long immersion in sea-water without injury to their germinative power. Hence we may assume that the seeds of many almost ubiquitous sand-binding grasses may be reckoned among those which are cast ashore in a vital condition; and we may also assume that these grasses are among the very first flowering plants to obtain a footing. Other herbaceous plants met

with in the earliest stage of such an insular flora are *Portulaca, Sesuvium, Canavalia obtusifolia,* and *Ipomœa biloba* (*Ipomœa pes-caprœ*); all of which seem to possess an unlimited power of colonisation. Moreover, they provide the conditions necessary for other plants to be able to establish themselves. Among the early shrubby occupants, *Suriana maritima, Pemphis acidula, Scævola kœnigii,* and *Tournefortia argentea* are prominent, being found on the most remote islets of the Pacific and Indian Oceans, within the tropical and subtropical zones. Where there are muddy shores, there the various mangroves (*Rhizophora, Bruguiera, Avicennia, Vitex,* &c.) take possession. Among the first real trees are, *Heritiera littoralis, Hibiscus tiliaceus,* and *Barringtonia speciosa,* together with screw pines. After this nucleus of a flora has been formed, it is comparatively easy for other arrivals to establish themselves; and every addition, in a measure, helps to provide the conditions for a still more varied vegetation. It may be safely assumed, therefore, that if oceanic currents and birds have not been the means of dispersing a large number of species of plants, and it is not certain that they have not, they are certainly the most important agents in stocking islands, for without their action the numerous remote coral islands, at least, would still be utterly devoid of phanerogamic vegetation, and consequently uninhabitable.

Even such plants as epiphytic orchids may owe their presence in an island to the action of the waves, as Mr Moseley observed of one in Little Ki Island (see Part III., p. 306); and in the Philippines he found a young sago-palm that had been washed up growing vigorously just above the ordinary beach-line. Granting that such occurrences may be comparatively rare, still the results in thousands of years might be very great. If an epiphytic orchid survive a sea voyage, why not almost any other plant in the large accumulations of vegetable drift that are carried out to sea by ordinary currents, and driven hither and thither by extraordinary storms?

Broadly speaking, the more remote the island, the fewer and the commoner the species that would be likely to reach it, and such we find to be the case.

As a further example of a flora that owes its existence mainly, if not wholly, as far its phanerogamic element is concerned at least, to oceanic currents and birds, the Bermudan may be named. In Part I., p. 9, will be found a tabular view of the geographical distribution of the vascular plants, probably indigenous, in the Bermudas. Assuming that several of the plants which we have included as probably indigenous owe their presence to the agency of man, there would still remain a considerable number to be accounted for in other ways. We have attempted to classify them according to the most probable means by which they may have reached the islands. Of course there are some fruits and seeds adapted for transport in a variety of ways. There is one possible means by which some of the plants may have reached the islands, concerning which, however, too little is known for us to be able to judge of the extent it has operated, if at all. Like other creatures, birds doubtless sometimes pass portions of their digestible food

undigested, and assuming this, it is possible that some of the small-seeded plants reached the islands through seminivorous birds carried thither by violent storms. The following classification is only offered as a possible solution of the question of transport for each species. Other natural means of dispersal, such as winds, have not been considered, because the object was to bring into prominence what probably might be effected by the ocean and birds alone.

CLASSIFICATION OF THE FLOWERING PLANTS PROBABLY INDIGENOUS IN THE BERMUDAS, ACCORDING TO THE MEANS BY WHICH THEY MAY HAVE BEEN CONVEYED THITHER.

I.—*Chiefly Littoral Plants: Seeds probably conveyed to the Island by Oceanic Currents.*

Cakile æqualis.[1]
Hibiscus tiliaceus.
Suriana maritima.
Elæodendron xylocarpum.
Sapindus saponaria.
Dodonæa viscosa.
Cardiospermum halicacabum.
Rhus toxicodendron.
Sophora tomentosa.
Vigna luteola.
Canavalia obtusifolia.
Centrosema virginianum.
Conocarpus erectus.
Rhizophora mangle.
Opuntia vulgaris.
Sesuvium portulacastrum.
Rhachicallis rupestris.
Chiococca racemosa.
Morinda royoc.
Solidago sempervirens.
Borrichia arborescens.
„ *frutescens.*
Scævola lobelia.
Tournefortia gnaphalodes.
Heliotropium curassavicum.
Ipomœa pes-capræ.
„ *sagittata.*
„ *villosa.*
„ *acuminata.*
„ *jamaicensis.*
Convolvulus jamaicensis.
Avicennia nitida.
Coccoloba uvifera.
Atriplex cristata.
Salicornia ambigua.
Euphorbia buxifolia.
Croton maritimus.
Ruppia maritima.
Zostera marina.
Cenchrus tribuloides.
Spartina juncea.
Stenotaphrum americanum.
Sporobolus indicus.
„ *virginicus.*
Chloris petræa.

II.—*Marsh Plants: Seeds small, possibly conveyed to the Islands in Mud adhering to Birds.*

Montia fontana.
Ascyrum hypericoides.
Kosteletzkya virginica.
Waltheria americana.
Ludwigia repens.
Hydrocotyle asiatica.
Hydrocotyle umbellata.
Eupatorium fœniculaceum.
Solidago sempervirens.
Baccharis glomeruliflora.
Pluchea odorata.
„ *camphorata.*

Heliotropium curassavicum.
Herpestis monniera.
Atriplex cristata.
Polygonum acre.
Bœhmeria cylindrica.
Ceratophyllum demersum.
Spiranthes tortilis.
Juncus tenuis.
„ *marginatus.*
Typha angustifolia.
Lemna minor.
„ *trisulca.*
Cyperus odoratus.
Cyperus rotundus.
Kyllinga monocephala.
Heleocharis capitata.
„ *melanocarpa.*
„ *plantaginea.*
Dichromena leucocephala.
„ *pura.*
Scirpus lacustris.
Rhynchospora florida.
„ *stipitata.*
Cladium mariscus.
Paspalum distichum.
Spartina juncea.

It is perhaps more probable that many of the foregoing plants reached the islands in the vegetable drift cast ashore during violent storms.

III.—*Plants having more or less Fleshy Fruits: hence probably carried to the Islands by Frugivorous Birds.*

Ampelopsis quinquefolia.
Eugenia monticola.
Opuntia vulgaris.
Randia aculeata.
Psychotria undata.
Forestiera porulosa.
Duranta plumieri.
Coccoloba uvifera.
Peperomia obtusifolia.
Celtis occidentalis.
Myrica cerifera.
Juniperus bermudiana.
Sabal blackburniana.

This list, though the smallest, includes the only Bermudan indigenous trees, and one or two of the commoner inland shrubs. We have no irrefragable evidence of the *Sabal* occurring elsewhere, but even if it be endemic, it can only be a differentiated descendant of the same stock as the species which inhabit the opposite coast of America and the West Indies. The same may be said of *Erigeron darrellianus, Statice lefroyi, Sisyrinchium bermudiana*, and *Carex bermudiana*.

IV.—*Plants admitted as probably Indigenous, but perhaps equally likely to have been indirectly introduced into the Islands by Man.*

Arenaria alsinoides.
Sida carpinifolia.
Modiola multifida.
Triumfetta semitriloba.
Cardiospermum halicacabum.
Leucæna glauca.
Spermacoce tenuior.
Galium uniflorum.
Eupatorium fœniculaceum.
Solidago stricta.
Pluchea purpurascens.
Eclipta erecta.
Nama jamaicense.
Dichondra repens.
Phryma leptostachya.
Lippia nodiflora.
Stachytarpheta jamaicensis.
Priva echinata.
Urtica chamædryoides.
Parietaria debilis.
„ *pennsylvanica.*
Pilea microphylla.
Paspalum filiforme.
„ *setaceum.*

THE ANTARCTIC FLORA.

ORIGIN OF THE VEGETATION OF THE ISLANDS OF THE SOUTH INDIAN OCEAN.

Many recent writers on phytogeography allude to the American element in Australasian vegetation, and some have recognised the fact that the composition of the flora of the coldest southern zone in which flowering plants grow is essentially the same in all parts; but nobody, except Engler,[1] has very fully discussed this subject. Sir Joseph Hooker (Flora Tasmaniæ: Introductory Essay, pp. 89–91) follows Forster in designating this vegetation "Antarctic;" and he gives a list of species occurring in Australia and New Zealand, or in one or both of these countries, and Kerguelen, Tristan da Cunha, or Fuegia. Grisebach (Vegetation der Erde) defines an "Antarctic Forest Region" in South America, but the vegetation of all the southern islands, including New Zealand, is treated of under the general head of "Oceanic Islands."

Engler (*loc. infra cit.*) divides the vegetation of the earth into kingdoms, and the Antarctic flora is included in his "Old Oceanic Kingdom," which is subdivided into several regions and provinces, and comprises New Zealand, except the northern island, the greater part of Australia, the islands in the South Indian Ocean, South Africa, the Antarctic forest region of South America (which does not embrace the Falklands and Juan Fernandez), and the Tristan da Cunha, St Helena, and Ascension islands. We have not space to discuss the merits of this plan, which we believe the author himself would considerably modify with our data before him; but we agree generally with Drude that insular floras should be attached to the continental ones to which they exhibit the greatest affinity.

Drude (Petermann's Mittheilungen: Ergänzungsheft, No. lxxiv. p. 70) regards Fuegia, the Falklands, South Georgia, South Shetlands, Tristan da Cunha, Prince Edward, the Crozets, St Paul, Amsterdam, Macquarie, and Emerald Islands, as forming a distinct subregion, which he calls the "Antarctic Islands." *Fagus* he looks upon as properly belonging to this subregion and overlapping in other regions. Though this is a much more philosophical method of dealing with the subject than Grisebach's, it is not altogether satisfactory, because the proposed subregion is not correctly limited. It includes either too much or too little. As shown in Part II., pp. 143 and 261, the vegetation of the Tristan da Cunha group, and of Amsterdam and St Paul, consist largely of the same species, and is quite different in its main features (*Phylica* and *Spartina*) from that of Kerguelen and the other islands in a higher latitude. Further, there is no good reason why Macquarie Island should be placed in a different subregion from Auckland and Campbell Islands. Perhaps it would be better to extend this subregion, both in America and New Zealand, in spite of the large endemic element with which the types common to

[1] Versuch einer Entwicklungsgeschichte der Pflanzenwelt; in which work he has tabulated and fully analysed, among others, the floras of Australia and New Zealand.

the whole zone are associated in different parts of it. From our tabular views of the distribution of the plants inhabiting the various groups of islands in the South Indian Ocean, and the sketch of the flora of Macquarie Island a few pages forward, it is quite clear that in the southern, as in the northern hemispere, the only admissible demarcation of the coldest floral region is a zonal one. Proceeding northward in the three great land areas, the differences in the vegetation soon become so pronounced, that it is convenient to treat them as distinct floral regions; yet, apart from the Antarctic types, the relationships of the distribution of other peculiarly southern types is highly interesting, and seems to point to a migration northward, and a former greater land connection in the southern hemisphere. Wallace, while discarding Hutton's theory of a great southern continent uniting New Zealand and Australia with South America, and probably also with South Africa, suggests the probability of a former less interrupted communication between Cape Horn and New Zealand by way of the South Shetland Islands, Graham's Land, "whence the Antarctic continent or a group of large islands probably extends across or around the south polar area to Victoria Land, and thence to Adélie Land." And he assumes that there have been alternations of climate within the Antarctic Circle, as within the Arctic, "during which some portions of the now ice-clad lands became able to support a considerable amount of vegetation." Assuming this to be a correct deduction, the greater difficulties encountered in accounting for the present distribution of plants in the southern hemisphere disappear; for drifting ice and oceanic currents might well have conveyed seeds of the few plants found in the islands of the South Indian Ocean, when they were less isolated from each other than now. And, if we accept Dyer's theory of an original southward migration of the forms of vegetable life from which all the southern ones have been derived, this explanation is sufficient. But the evidence seems to point to a former greater land connection than Wallace admits, and to a northward migration of southern forms which has hardly ceased. Until more conclusive testimony is forthcoming of the former existence of Proteaceæ, *Eucalypti*, &c., in Europe, we cannot avoid the conviction that they originated in the south.

Sir Joseph Hooker, discussing[1] the probable origin of the vegetation of Kerguelen Island, says: "Turning to the natural agents, winds are no doubt the most powerful and sufficient to account for the transport of the cryptogamic spores; these, almost throughout the year, blow from Fuegia to Kerguelen Island, and in the opposite direction only for very short periods, but appear quite insufficient to transport seeds over 4000 miles. Oceanic currents have, doubtless, brought the marine algæ; but the transport of the seeds of the fresh-water plants, of the grasses, and of the two plants with hooked and barbed appendages to the fruit, is not apparent in the case of a country that has no land-birds but an endemic one (*Chionis*), and of which the water-birds come to land only, or chiefly, at the breeding season, and this after long periods of oceanic life in a most

[1] *Philosophical Transactions of the Royal Society of London*, clxviii. p. 13.

tempestuous ocean. Even supposing that the sea-birds which habitually breed in Kerguelen Island did visit Fuegia between the periods of incubation, it is difficult to imagine that any seeds which had adhered to their beaks, feet, or bodies on leaving the latter country would not have been removed by the buffets of winds and waves over upwards of 4000 miles of ocean. The supposition that more land formerly existed along the parallels between Fuegia and Kerguelen Island, possibly in the form of islands, remains as the forlorn hope of the botanical geographer. By such stepping-stones, the land-birds so numerous in the Falkland Islands (which lie in the direction of such hypothetical islands), and of which the vegetation is identical with that of colder South America, favoured by the prevalent westerly gales, have passed from thence to Kerguelen Island, having adhering to them fruits and seeds. The absence of such birds from the present air-fauna of Kerguelen Island offers no obstacle to such a speculation, as such immigrants would on their arrival speedily be destroyed by the predatory gull and petrels of the island."

The following table, showing the connections between the Australasian and South American and African floras, was compiled from various sources, but largely from Engler's work cited above, verified and amplified by the material at Kew.

ON THE RELATIONSHIP BETWEEN THE VEGETATION OF SOUTH AMERICA, AUSTRALASIA, SOUTH AFRICA, AND THE INTERVENING ISLANDS.[1]

Name.	Distribution of the Order, Genus, or Species.
RANUNCULACEÆ.	
Myosurus aristatus	New Zealand, Chili, and California; perhaps introduced in the south.
Ranunculus lyallii	New Zealand species remarkable for their large peltate leaves; the only other similar species being *Ranunculus baurii*, in the Transvaal, South Africa, at an elevation of 5000 feet.
„ *traversii*	
**Caltha*	The section *Psycrophila* is restricted to Australia, New Zealand, and South America.
MAGNOLIACEÆ.	
**Drimys*	New Zealand through Australia to Borneo, and in South America from Cape Horn and Juan Fernandez through the Andes to Mexico.
CARYOPHYLLEÆ.	
**Colobanthus*	Australia, New Zealand, Heard, Kerguelen, St Paul Islands, and Cape Horn to Mexico.
**Colobanthus subulatus*	Australasia and Fuegia.
„ *quitensis*	New Zealand and Cape Horn, through the Andes to Mexico.
Lyallia	Endemic in Kerguelen: nearest affinity, *Pycnophyllum* in the Andes.

[1] Limited to flowering plants; and such genera as *Clematis*, and such species as *Deschampsia cæspitosa*, the distribution of which has no special bearing on the connections between the floras of these regions, are omitted. Australasia is employed to designate Australia, Tasmania, and New Zealand, and the contiguous small islands collectively. Australia, in the remarks on the distribution, may or may not include Tasmania; the latter being used only when that alone, excluding Australia proper, is part of the area. South America includes the Falkland Islands and Juan Fernandez. The genera and species preceded by an asterisk are represented both in Australia proper, or Tasmania and New Zealand.

Name.	Distribution of the Order, Genus, or Species.
PORTULACEÆ.	
**Claytonia*	One species endemic in Australasia, and numerous species in America, from the Antarctic regions to North America.
ELATINEÆ.	
**Elatine americana* . . .	Australasia, Fiji Islands, North and South America.
TILIACEÆ.	
**Aristotelia*	One species in Chili, the rest in Australasia and Polynesia.
GERANIACEÆ.	
**Geranium sessiliflorum* . .	Australasia, Fuegia, and Chili.
**Pelargonium*	Numerous in South Africa and two or three in Australasia, one of which also occurs in Tristan da Cunha.
**Oxalis magellanica* . . .	Australasia, Fuegia, and South Chili.
RHAMNEÆ.	
**Discaria*	One endemic species in New Zealand, one in Australia, and several in South America.
CORIARIEÆ.	
Coriaria thymifolia . . .	New Zealand and South America.
,, *ruscifolia* . . .	New Zealand and adjacent islands, and very common in Chili.
LEGUMINOSÆ.	
**Sophora tetraptera* . . .	Australasia, Polynesia, and South America.
ROSACEÆ.	
**Acæna*	Australasia, Sandwich Islands, all the islands from the Macdonald group and Amsterdam to Tristan da Cunha, Cape Horn to California, and in the Sandwich Islands. **Acæna adscendens* is found in New Zealand and Fuegia, and the islands of the South Indian Ocean.
**Geum*	Allied species in Tasmania, New Zealand, and Fuegia.
Eucryphia	Endemic species in Tasmania, Australia, and Chili.
SAXIFRAGEÆ.	
**Donatia*	One species in Australasia and one in Fuegia.
**Weinmannia*	One species in Tasmania, two in New Zealand, many in South America, especially in the Andes, and several in the Mascarene Islands and Polynesia.
CRASSULACEÆ.	
Tillæa moschata . . .	New Zealand and adjacent islands, Kerguelen, Marion, and Falkland Islands, Fuegia and Chili.
Tillæa verticillata . . .	Australasia and Chili.
DROSERACEÆ.	
**Drosera*	The Australasian *Drosera arcturi* is very nearly related to the Fuegian *Drosera uniflora*.
HALORAGEÆ.	
Haloragis alata . . .	New Zealand and Juan Fernandez.
**Myriophyllum elatinoides* . .	Australia and Chili.
* ,, *variæfolium* .	Australasia and South America.
**Gunnera*	Australasia, South Africa, and America, from Fuegia and Juan Fernandez to Mexico.

Name	Distribution of the Order, Genus, or Species.
MYRTACEÆ.	
**Metrosideros*	One endemic species in South Africa, many in Australasia, and a few in Polynesia. *Metrosideros polymorpha*, common in New Zealand and throughout Polynesia.
ONAGRARIEÆ.	
Fuchsia	Two or three species endemic in New Zealand, and many in America, ranging from Fuegia to Mexico, and one species occurring in the West Indies.
**Epilobium junceum* . . .	Australasia and Chili.
Œnothera	One species of this large otherwise American genus is endemic in the alpine marshes of Tasmania; it is closely allied to a common American one.
CUCURBITACEÆ.	
**Sicyos angulatus* . . .	Australasia and America on both coasts. A littoral plant, and the only member of the order in New Zealand.
FICOIDEÆ.	
**Tetragonia expansa* . . .	Australasia and South America; also in Japan.
**Mesembryanthemum æquilaterale*	Australia and Tasmania, and Chili to California; and closely allied to the South African *Mesembryanthemum acinaciforme.*
* „ *australe* .	Australasia and Polynesia.
„ *crystallinum*	Australia, South Africa, California, and Mediterranean region.
UMBELLIFERÆ.	
**Hydrocotyle americana* . .	New Zealand, North and South America; and several other species of the two regions are closely related.
**Pozoa*	New Zealand, Tasmania, and South America.
**Azorella*	Australasia, Macdonald group, and intervening islands to Marion, and South America.
Huanaca	Two Australian species, and four extratropical South American; and one is recorded from Mexico.
Azorella selago	Marion to the Macdonald group, and in Macquarie Island and Fuegia.
**Crantzia lineata* . . .	Australasia and Chili to the United States.
**Apium australe* . . .	South temperate and cold regions generally.
**Oreomyrrhis*	Australasia and America, from Chili to Mexico, with endemic species in both regions.
„ *andicola* . . .	Australasia and the Andes, northward to Mexico.
**Daucus brachiatus* . . .	Australasia and America.
CORNEÆ.	
Griselinia	Endemic species in New Zealand, Chili, and Brazil.
RUBIACEÆ.	
**Nertera*	New Zealand to Java and the Philippines, Tristan da Cunha and Fuegia to Mexico, with endemic species in each region.
**Nertera depressa* . . .	Australasia, Tristan da Cunha, Fuegia to Mexico, and in the Sandwich Islands.
**Coprosma*	Numerous in New Zealand and extending northward to Borneo, throughout Polynesia, and one endemic species occurs in Juan Fernandez.

Name.	Distribution of the Order, Genus, or Species.
COMPOSITÆ.	
**Lagenophora*	Australasia to India and the Sandwich Islands, with a few species in South America, one of which reaches Tristan da Cunha.
**Abrotanella*	Several species in Australasia and one in the Falklands.
Cotula plumosa	Crozets, Kerguelen, Macquarie, Auckland, and Campbell Islands.
Flaveria	Seven species, six of which inhabit America, ranging from Chili to Mexico and Florida, and one Australia, the Australian species being very near one of the commoner American ones.
**Microseris*	A genus of about a dozen species, whereof one is found in Extratropical South America, one in Australasia, and the rest in North-west America.
STYLIDEÆ.	
**Phyllachne*	Australasia and Fuegia.
LOBELIACEÆ.	
**Lobelia anceps*	Australasia, South America, and South Africa.
**Pratia*	Endemic species in Australasia, South America, and Asia.
**Selliera radicans*	Australasia and Chili.
ERICACEÆ.	
**Pernettya*	One species endemic in Tasmania and New Zealand, and the rest in South America.
*ERICACEÆ, sub-ord. EPACRIDEÆ	Restricted to Australasia, Polynesia, Malayan Peninsula and Archipelago, except the monotypic *Lebetanthus americanus*, and specially numerous in Australia.
PRIMULACEÆ.	
**Samolus repens*	Australasia, Polynesia, and South Chili.
GENTIANACEÆ.	
**Gentiana saxosa*	The only species found in Australia, with which Mueller unites the South American *Gentiana magellanica*.
CONVOLVULACEÆ.	
Calystegia tuguriorum	New Zealand, Masafuera, Chili.
SCROPHULARINEÆ.	
Calceolaria	Two endemic species in New Zealand, and many in America, ranging from the Falklands and Fuegia to Mexico.
**Gratiola peruviana*	Australasia and South America.
Veronica elliptica	Australasia, Falklands, and Fuegia.
Ourisia	One species endemic in Tasmania, about six in New Zealand, and about a dozen in America, ranging from Fuegia to New Grenada.
PLANTAGINEÆ.	
**Plantago*	*Plantago brownii*, found in Tasmania and New Zealand, has a representative species in the South American *Plantago barbata*.
**Euphrasia antarctica*	Australasia and Chili.
POLYGONEÆ.	
**Muehlenbeckia*	Endemic species in Australasia and in the Andes.

Name.	Distribution of the Order, Genus, or Species.
MONIMIACEÆ.	
Laurelia	One species endemic in New Zealand, and one in Chili.
PROTEACEÆ.	Chiefly endemic genera in the Australasian, African, and American regions: in Asia, *Helicia* extends northward to Japan; in Africa a few members of the order reach Abyssinia and Madagascar, and in America *Roupala* reaches Mexico. None eastward of New Caledonia and New Zealand in Polynesia.
Roupala	Two or three species in New Caledonia, and the rest (about thirty) in America.
Lomatia	About half-a-dozen species in Eastern Australia, and three in Chili.
Embothrium	One species endemic in Eastern Australia, and the rest (four) in America, ranging from Magellan Strait to Peru.
Orites	One species endemic in Chili, and the rest in Australia.
THYMELEACEÆ.	
**Drapetes*	Three Australasian species, one Bornean, and one Fuegian.
CUPULIFERÆ.	
**Fagus*	The section *Nothofagus* is restricted to Australasia and South America, with endemic species in Australia, New Zealand, Fuegia, and Chili. In Australia the genus reaches the head of the Mackay River, New South Wales.
CONIFERÆ.	With the exception of *Saxegothea*, all the South American genera of this order are also represented in Australasia.
**Podocarpus*	The New Zealand *Podocarpus spicata*, and the American *Podocarpus andina*, are closely allied.
Araucaria	The section *Columbea* is represented by endemic species in New Caledonia, Eastern Australia, Chili, and Brazil.
Libocedrus	New Zealand, New Caledonia, China, Japan, Chili, and California.
Fitzroya	One species endemic in Chili, and the only other (*Diselma*) in Tasmania.
**Dacrydium*	Australasia, Malaya, Polynesia, and Chili.
IRIDEÆ.	
**Libertia*	Endemic species in Australia, New Zealand, and Fuegia.
NAIADACEÆ.	
**Triglochin striatum* . . .	North and South America, South Africa, and Australasia.
LILIACEÆ.	
Luzuriaga	Two species endemic in Chili, and one (*Callixene*) in Fuegia and New Zealand.
**Astelia*	Chiefly New Zealand, and represented in Fuegia, South-eastern Australia, and the Sandwich Islands.
JUNCACEÆ.	
**Juncus planifolius* . . .	Australia, New Zealand, and western coast of South America, from Chili to Bolivia.
**Juncus vaginatus* . . .	Tasmania and New Zealand, and very closely allied to the Chilian *Juncus procerus*.
**Juncus scheuchzerioides* . .	Australasia, Kerguelen, Fuegia.

Name.	Distribution of the Order, Genus, or Species.
**Luzula crinita*	Auckland, Campbell, and Macquarie Islands, and closely allied to the Fuegian *Luzula alopecurus*.
Rostkovia magellanica	Campbell Island and the Falklands, and Fuegia to the Andes of Quito.
*RESTIACEÆ.	This Order is almost confined to Australia and South Africa; very few occur in New Zealand, one in Cochin-China, and one only in South America. The African and Australian genera are mostly distinct.
**Leptocarpus*	Of the nineteen species described, ten are from Australia, one from New Zealand, one from Chili, one from Cochin-China, and seven from South Africa.
Restio	There are about 100 species of this genus, twenty-two of which are endemic in Australia, and the rest in South Africa.
Hypolæna	Five species have been found in Australia, one of which extends to New Zealand; the rest (about a dozen) are endemic in South Africa.
CENTROLEPIDEÆ.	
**Gaimardia*	One endemic species each in New Zealand, the Auckland Islands, and Chili.
CYPERACEÆ.	
**Oreobolus*	Two or three closely allied species inhabit Australia, New Zealand, and Chili; and Mann describes one from the Sandwich Islands.
**Oreobolus pumilio*	Tasmania, New Zealand, and Chili.
**Carpha*	Two species, one inhabiting Australia and New Zealand, and the other Fuegia and Chili.
**Schœnus*	The New Zealand *Schœnus pauciflorus*, and the Chilian *Schœnus antarcticus*, are very closely related.
**Scirpus nodosus*	Australasia, St Paul Island, South Africa, St Helena, and Extratropical South America.
Scirpus riparius	Australasia, South Africa, and South America, and very near the widely spread *Scirpus setaceus*.
Scirpus aucklandicus	New Zealand, Amsterdam Island, and South America.
Carex trifida	New Zealand and the adjacent islands, the Falklands, and Fuegia.
**Uncinia*	Australia and New Zealand; through the islands in the southern part of the Indian Ocean to the Tristan da Cunha group, the Falklands, Fuegia, and northward through the Andes to Mexico and the West Indies; and one is found in the Sandwich Islands.
GRAMINEÆ.	Several of the Gramineæ of the Australasian and South American regions are very closely allied, and **Hierochloë redolens* and **Agrostis magellanica* (*Agrostis antarctica*) occur in both.

The total number of species in the foregoing table inhabiting both Australasia and South America is forty-eight, and the number of other essentially southern genera represented in the two regions by closely related species is forty-nine. These numbers are small in comparison with the total number of genera and species inhabiting Extratropical Australasia and Extratropical South America; but their significance is more apparent when we reflect that these genera and species are chiefly confined to New Zealand, the contiguous islands, and the mountain flora of Victoria and Tasmania, and that all the species of wider distribution common to the two countries are omitted. Forty-six out of

these forty-eight species, and thirty-six out of the forty-nine genera of which there are representative species in the two regions, occur in New Zealand. Including vascular cryptogams, of which there are 138, Engler tabulates 1094 species of New Zealand plants, of which 671 are endemic. Another point to consider is the individual prominence of the species and genera in question. Taking *Fagus* and the coniferous genera, we find that they constitute the principal forests of the colder regions of the two countries. The distribution of the Epacrideæ, Proteaceæ, and Restiaceæ, deserves special study, as they belong chiefly to the warm temperate parts of the three areas, generally speaking; only two species of Proteaceæ inhabit New Zealand, however, and one each of Epacrideæ and Restiaceæ South America.

The Falkland Islands flora, which Engler separates from his "Old Oceanic Floral Kingdom," is essentially Fuegian, and richer in endemic species than the Auckland, Campbell and Macquarie Islands, near New Zealand.

DISTRIBUTION OF FALKLAND ISLANDS FLOWERING PLANTS.[1]

Name.	Distribution.
RANUNCULACEÆ.	
**Ranunculus biternatus*	Fuegia, Kerguelen.
„ *maclovianus*	Endemic.
„ *sericocephalus*	Endemic.
„ *hydrophilus*	Endemic.
„ *trullifolius*	Endemic.
Hamadryas argentea	Endemic.
**Caltha sagittata*	Fuegia, Port Famine, and Hermite Island.
„ *appendiculata*	Fuegia, Port Famine, and Hermite Island.
CRUCIFERÆ.	
Arabis macloviana	Endemic.
**Cardamine hirsuta*	Very widely diffused.
Draba falklandica	Endemic.
VIOLARIEÆ.	
**Viola maculata*	Magellan Strait.
„ *tridentata*	Staten Land, Port Famine, Hermite Island.
DROSERACEÆ.	
**Drosera uniflora*	Fuegia, Port Famine, Magellan Strait.
CARYOPHYLLEÆ.	
Sagina procumbens	Very widely diffused.
**Colobanthus subulatus*	Good Success Bay, Hermite Island, Australasia.
„ *crassifolius*	Magellan Strait, Port Famine.
**Stellaria debilis*	Staten Land.
Cerastium arvense	Widely diffused.

[1] From Hooker's Flora Antarctica, ii., with fuller distribution added. A few additional species have been collected in the islands since the publication of this work, we believe. The genera preceded by an asterisk are also represented in New Zealand.

Name.	Distribution.
GERANIACEÆ.	
**Oxalis enneaphylla*	Endemic.
ROSACEÆ.	
**Rubus geoides*	Magellan Strait, Port Famine.
**Acæna lucida*	Endemic.
„ *lævigata*	Magellan Strait, and Hermite Island.
„ *adscendens*	Fuegia, South Georgia, Kerguelen, and New Zealand.
ONAGRARIEÆ.	
**Epilobium tetragonum*	Widely diffused.
HALORAGEÆ.	
**Myriophyllum elatinoides*	Chili, Andes, New Zealand, Australia.
**Callitriche verna*	Widely diffused.
**Gunnera magellanica*	Fuegia; South Chili.
MYRTACEÆ.	
**Myrtus nummularia*	Fuegia and South Chili.
PORTULACEÆ.	
**Montia fontana*	Very widely spread.
CRASSULACEÆ.	
**Tillæa moschata*	Southern cold temperate zone.
UMBELLIFERÆ.	
**Azorella cæspitosa*	Magellan Strait, Port Gregory.
„ *filamentosa*	Magellan Strait, Port Famine, &c.
„ *lycopodioides*	Fuegia, Port Famine, &c.
„ *ranunculus*	Endemic.
Bolax glebaria	Fuegia, Good Success Bay, and Hermite Island.
**Apium australe*	South temperate and cold temperate zones.
**Crantzia lineata*	South temperate and cold temperate zones and Andes.
**Oreomyrrhis andicola*	Chili, Andes to Mexico, and in Australasia.
RUBIACEÆ.	
**Galium antarcticum*	Fuegia; Staten Land; Crozets; Kerguelen Island.
**Nertera depressa*	Chili, through the Andes to Mexico, Tristan de Cunha, New Zealand, &c.
COMPOSITÆ.	
Chiliotrichum amelloides	Fuegia and South Chili.
Aster vahlii	Fuegia and South Chili.
**Lagenophora commersonii*	Fuegia, South Chili, and Tristan da Cunha.
Baccharis magellanica	Fuegia.
**Abrotanella emarginata*	Magellan Strait, Port Famine, &c.
**Gnaphalium spicatum*	Widely spread in South America.
„ *antarcticum*	Endemic.
**Senecio candidans*	Fuegia.
„ *falklandicus*	Endemic.
„ *littoralis*	Endemic.
Chevreulia lycopodioides	Endemic

Name.	Distribution.
Nassauvia serpens	Endemic.
„ *gaudichaudii*	Fuegia, Magellan Strait.
Chabræa suaveolens	Endemic.
Homoianthus echinulatus	Magellan Strait, Ports Famine and Gregory.
Achyrophorus arenarius	Magellan Strait, Port Gregory.
**Taraxacum dens-leonis*	Generally diffused.
Macrorhynchus pumilus	Endemic.
Hieracium antarcticum	Patagonia.
Lobeliaceæ.	
**Pratia repens*	Fuegia, Staten Land.
Ericaceæ.	
**Pernettya pumila*	Fuegia and South Chili.
**Gaultheria microphylla*	Fuegia, Magellan Strait, &c.
Gentianaceæ.	
**Gentiana magellanica*	Fuegia, Magellan Strait. Hardly different from the Australasian *Gentiana saxosa*.
Scrophularineæ.	
**Calceolaria fothergillii*	Magellan Strait, Port Famine.
„ *polyrhiza*	Patagonia.
**Limosella aquatica*	Widely dispersed.
**Veronica elliptica*	Magellan Strait to Cape Horn and New Zealand.
Primulaceæ.	
Primula magellanica[1]	Magellan Strait to Cape Horn.
Anagallis alternifolia	Magellan Strait, Port Famine.
Plumbagineæ.	
Statice armeria	Fuegia, Patagonia, and in the northern hemisphere.
Plantagineæ.	
**Plantago monanthos*	Hermite Island, Cape Horn.
Chenopodiaceæ.	
**Chenopodium macrospermum*	Endemic.
Santalaceæ.	
Nanodea muscosa	Fuegia, Magellan Strait.
Thymeleaceæ.	
**Drapetes muscosa*	Fuegia, Magellan Strait.
Empetraceæ.	
Empetrum rubrum	South Chili, Fuegia, and Tristan da Cunha.
Orchideæ.	
Chloræa gaudichaudii	Endemic.
Asarca commersonii	Magellan Strait.
„ *odoratissima*	Chili.
Codonorchis lessonii	Fuegia and Magellan Strait.

[1] Sir Joseph Hooker now regards this as specifically distinct from *Primula farinosa*, to which he reduced it in the Flora Antarctica. See *Journ. Linn. Soc. Lond.*, xx. p. 2.

Name.	Distribution.
IRIDEÆ.	
Sisyrinchium filifolium	Cape Gregory and Magellan Strait.
LILIACEÆ.	
**Callixene marginata*	Fuegia.
**Astelia pumila*	South Chili, from the Chonos Archipelago to Cape Horn.
JUNCACEÆ.	
**Rostkovia grandiflora*	Throughout Fuegia.
„ *magellanica*	Magellan Strait to Cape Horn, and in Campbell Island.
**Juncus scheuchzerioides*	Widely spread in the southern cold temperate zone.
**Luzula alopecurus*	Magellan Strait. Closely allied to the New Zealand *Luzula crinitus*.
NAIADACEÆ.	
**Triglochin magellanicum*	Magellan Strait to Cape Horn.
CENTROLEPIDEÆ.	
**Gaimardia australis*	Fuegia.
CYPERACEÆ.	
**Oreobolus obtusangulus*	Fuegia.
**Eleocharis palustris*	Widely diffused.
**Isolepis pygmæa*	South Chili.
**Carex ovalis*	Widely spread.
„ *curta*	Widely spread, including Fuegia.
„ *acaulis*	Endemic.
„ *decidua*	Fuegia.
„ *indecora*	Endemic.
„ *trifida*	Cape Tres Montes, Australia, and New Zealand.
**Uncinia macloviana*	Endemic, but very closely allied to species in the islands from Tristan da Cunha to Kerguelen.
GRAMINEÆ.	
**Alopecurus alpinus*	Fuegia and northern hemisphere.
**Agrostis alba*	Very widely spread.
„ *prostrata*	Endemic.
„ *falklandica*	Endemic.
„ *antarctica*	South Chili, Fuegia, Kerguelen Island, and New Zealand.
**Arundo pilosa*	Endemic.
**Hierochloe magellanica*	Throughout Fuegia.
Aira flexuosa	Fuegia and northern hemisphere.
„ *antarctica*	Fuegia, Kerguelen's Land.
**Trisetum subspicatum*	Widely spread in south temperate zone.
**Festuca arundo*	Fuegia.
„ *antarctica*	Endemic.
„ *arenaria*	Magellan Strait, Port Famine.
„ *magellanica*	Magellan Strait, Port Famine.
Dactylis cæspitosa	Throughout Fuegia.
Triticum repens	Widely diffused.

Total, 115 species belonging to eighty-four genera, fifty-six of which are represented in New Zealand. Here, as in the islands contiguous to New Zealand, there is no endemic genus; but the endemic species number twenty-six, or 22·6 per cent. of the whole. Leguminosæ are wholly wanting, as they are, we believe, in Fuegia. A very few have been collected at Port Famine, Port Gregory on the opposite side of Magellan Strait, and one in Elizabeth Island in the Strait. We have already alluded to the absence or great rarity of Leguminosæ in insular floras where there is no littoral element, but the flora of the colder southern regions generally is exceptionally poor in this order. In the Arctic regions there are at least thirty-four species, belonging to twelve genera.

In Sir James Ross's Narrative of his Antarctic Voyage (ii. p. 293) are the following remarks by Sir J. D. Hooker on the vegetation of the extreme south of America: "As Hermite Island is situated close to Cape Horn (56° S. lat.), a list of the indigenous plants is given. Only four species of flowering plants reach the top of Mount Kater, a peak of greenstone 1700 feet above the sea, and the culminant point of the island. They are: *Azorella selago, Abrotanella emarginata, Pernettya pumila*, and *Empetrum rubrum*. The following species reach an elevation of 1500 feet on the same or neighbouring peaks: *Viola tridentata, Saxifraga bicuspidata, Escallonia serrata, Azorella lycopodioides, Ourisia breviflora, Drapetes muscosa, Fagus antarctica* (only three inches long), *Luzula* sp., *Triodia antarctica, Aira parvula*, and *Festuca erecta*." In the place cited are particulars of the flora of the lower part of the island, where vegetation is relatively varied and luxuriant. Extensive forests of beech (*Fagus fosteri* and *Fagus antarctica*) exist, intermingled with *Drimys winteri*, and a sparse undergrowth of *Berberis ilicifolia, Veronica elliptica*, &c. Among the genera of herbaceous plants represented are: *Caltha, Astelia, Forstera, Donatia, Pinguicula, Primula, Senecio, Carex*, and *Juncus*.

THE FLORA OF MACQUARIE ISLAND.

No endemic flowering plant or fern has been collected in Macquarie Island. Nevertheless the flora clearly belongs to the same category as the Crozets, Kerguelen, Auckland, &c., between which, as we believe, there was formerly a closer land connection. Great interest attaches to the botany of this island, on account of its being the most southerly land known to support phanerogamic vegetation at the present time, if we except the Archipelago at the southern extremity of America and the South Shetlands, in about 62° S. lat., where one flowering plant, *Aira antarctica*, was collected by Dr Eights, and is preserved in the Kew Herbarium. At Cockburn Island, in 64°, Sir J. D. Hooker found only cellular cryptogams.[1]

South Georgia, which lies in about the same latitude as Macquarie, but nearly on the

[1] See Sir James Ross's Voyage in the Southern and Antarctic Regions, ii. p. 335.

opposite side of the globe, and about 1000 miles east of Cape Horn, was covered with perennial snows and the harbours blocked up with everlasting glaciers, still Captain Cook found a scanty vegetation, consisting of "a coarse strong-bladed grass, growing in tufts, a wild burnet [most likely a species of *Acæna*], and a moss-like plant which springs from the rocks."[1]

In the Kew Herbarium there are specimens of only seven species of flowering plants and one fern from Macquarie Island, which were sent by Mr Fraser of the Sydney Botanic Garden about fifty years ago. They are: *Acæna sanguisorbæ*, *Acæna adscendens*, *Azorella selago*, *Pleurophyllum criniferum*, *Cotula plumosa*, *Luzula crinita*, and *Aspidium aculeatum*, var. *vestitum*.

But now, thanks to the zeal with which botany is pursued at the antipodes, we have a general knowledge of the flora. Towards the end of 1880, Dr J. H. Scott of the Otago University availed himself of an opportunity to visit the island and investigate its natural history; and he published the results in the Transactions of the New Zealand Institute (xv. p. 484), from which we extract some passages of special interest, as well as the list of plants collected, merely adding the distribution of the species in full, as we were unaware of the existence of Dr Scott's paper before it was too late to give this information elsewhere.

Macquarie Island lies about 600 miles to the south-west of New Zealand, more than twice as far away as the Auckland group, and is separated from that group and from Campbell Island by very much deeper water than that which lies between them and New Zealand. There is a great valley 3000 fathoms deep between Macquarie Island and the Auckland and Campbell Islands, while the sea between them and New Zealand is not 1000 fathoms deep. It is situated between 54° 26′ and 54° 44′ S. lat., and 159° 5′ 45″ and 159° 1′ 45″ E. long., being about eighteen miles long and five miles broad. The surface is hilly, though the greatest height is probably not more than 600 or 700 feet. The interior of the island shows the rocky tops of the hills blown perfectly bare by the wind, and fissured by the frosts; and in the hollows of the uplands lie a number of little lakes, which empty themselves by streams. These either make valleys for themselves, or tumble down the steep hill-sides in miniature cascades. The general appearance of Macquarie Island is barren in the extreme; not a tree nor a shrub on the island, and what vegetation there is has a great deal of sameness; long stretches of yellowish tussock (*Poa foliosa*), with occasional large patches of *Stilbocarpa polaris*, or of the peculiar sage-green *Pleurophyllum*. These, with the rich brown mosses near the hill-top, are all that strike the eye in looking at the island from the sea. *Azorella selago* grows on the hill-sides, forming prominent globular masses often four feet across. These are green on the surface, where the living part of the plant lies as a crust to the great mass of *débris* of former years' growth, through which the roots descend. The whole is so solid that one can stand upon it, and the surface so

[1] See Hooker's Flora Antarctica, p. 216.

uniform and dense that lichens and other small plants are sometimes found growing upon it. *Pleurophyllum criniferum*, collected in flower and fruit, is the handsomest plant on the island; its long sage-green leaves and purple flowers making it very prominent. *Stilbocarpa polaris*, the Macquarie Island cabbage of the sealers, was also collected in flower and fruit. In sheltered corners in the lower ground it is a handsome plant, and its bright green leaves are always conspicuous. Many of the plants collected were not in flower, hence the species could not always be determined with certainty. The visit was made in November, when the spring is little advanced in that latitude; and Dr Scott does not regard his collection as being complete, though he doubts the existence of any other noteworthy plants. In the ensuing list the distribution of the genuine plant is given, even when the Macquarie Island specimen was not identified with certainty.

Name.	Distribution.
RANUNCULACEÆ.	
Ranunculus acaulis, Banks and Sol.?	New Zealand and Auckland group.
CARYOPHYLLEÆ.	
Colobanthus muscoides, Hook. f.	Auckland and Campbell Islands.
ROSACEÆ.	
Acæna buchanani, Hook. f.	New Zealand.
„ *adscendens*, Vahl.	New Zealand, Fuegia, Falklands.
CRASSULACEÆ.	
Tillæa sinclairii, Hook. f.	New Zealand.
UMBELLIFERÆ.	
Azorella selago, Hook. f.	Marion, Crozets, Kerguelen and Heard Islands, and Fuegia.
„ *lycopodioides*, Gaud.?	Fuegia and Falkland Islands.
ARALIACEÆ.	
Stilbocarpa polaris, Dene. and Planch.	New Zealand, Auckland and Campbell Islands.
RUBIACEÆ.	
Coprosma repens, Hook. f.	New Zealand, Auckland and Campbell Islands.
COMPOSITÆ.	
Pleurophyllum criniferum, Hook. f.	Auckland and Campbell Islands.
Cotula plumosa, Hook. f.	Auckland and Campbell Islands, the Crozets, and Kerguelen Islands.
JUNCACEÆ.	
Luzula crinita, Hook. f.	Auckland and Campbell Islands.
„ *campestris*, Linn.	Temperate regions generally.
GRAMINEÆ.	
Poa foliosa, Hook. f.	New Zealand, Auckland and Campbell Islands.
„ *annua*, Linn.	Northern hemisphere, and now widely colonised.
Festuca duriuscula, Linn.	Widely spread in temperate regions.

Name.	Distribution.
FILICES.	
Aspidium aculeatum, Swartz, var. *vestitum*, Hook.	This variety is found in New Zealand, Australia, Tasmania, and Fuegia.
Polypodium australe, Mett.	General in south temperate zone.
Lomaria alpina, Spreng.	South temperate zone, including the islands of the Southern Indian Ocean, though hitherto not recorded from the Auckland and Campbell Islands.

Besides the foregoing vascular plants, Dr Scott collected twenty-one species of cellular cryptogams. Disregarding *Poa annua*, which Scott thinks may have been introduced, as it was only found near one of the sealers' huts, there are eighteen vascular plants, whereof twelve are also found in New Zealand, and of these two were previously only known from New Zealand, and four only from New Zealand and the Auckland and Campbell Islands; while of the remaining six, three are only known to inhabit the Auckland, Campbell, and Macquarie Is lands; one is restricted to these islands, the Crozets and Kerguelen Islands; finally, the genus *Azorella* is not represented in New Zealand, or any of the other adjacent islands.

CONCLUDING REMARKS.

Bermudas.—The composition of the flora of these islands so clearly indicates its origin, and the means by which the majority of the species reached the islands are so obvious, that it would be superfluous to adduce further evidence thereon; but it may be mentioned, in connection therewith, that there is a much greater overlapping of the West Indian flora in South Florida than was formerly supposed. Many of the indigenous Bermudan plants are very rare; some probably through cultivation; others, perhaps, on account of being late arrivals.

Fernando-Noronha.—As the main island of this group is still botanically almost unknown, it is impossible to say whether there be any generic endemic element, though from the sample of the flora collected in the adjacent islets by Mr Moseley, it is not probable that any exists. Associated with a number of very common plants, are a few apparently endemic species of common American genera. The most noteworthy point in connection with the vegetation is the apparent total absence of ferns and mosses.

Ascension.—Whether this island ever supported anything more than its present extremely meagre flora is problematical; but the presence of two distinct endemic species of flowering plants belonging to widely diffused genera, is no help to the solution of the problem. The one, *Hedyotis adscensonis*, is not very different from African and Asiatic species; and the other, *Euphorbia origanoides*, belongs to a group of littoral, mostly shrubby species, widely spread in Polynesia, with one species in the West Indies and the

Bermudas, and two on the western coast of Tropical Africa. Two St Helena endemic plants (see Part II., p. 34) are recorded from Ascension, but there are no specimens in the London Herbaria corroborating this, and it is almost certain that there was some mistake.

St Helena.—In common with that of Juan Fernandez and some other islands, the endemic element of the flora of St Helena includes a considerable proportion of arboreous Compositæ, the origin of which seems to be more remote and uncertain than that of the rest. We have entered at some length into the distribution of arboreous Compositæ generally, without, however, arriving at any even probable solution of the problem of how they reached these islands. Unlike the remainder of the element, the arboreous Compositæ of St Helena and Juan Fernandez are, to say the least, not more closely allied to the Compositæ of the nearest continents than they are of some more distant regions. The St Helena Compositæ, for example, exhibit quite as close a relationship to certain South American and Australian genera as they do to African; and the Juan Fernandez Compositæ exhibit no less distinct affinities. In Chili the characteristic and prevailing tribe of Compositæ is the Mutisiaceæ, which form, according to Bentham, nearly a third of the whole number; yet this tribe is not represented in Juan Fernandez; but what is more singular, the only Mutisiaceous genus in the Pacific islands is the very rare, monotypic, endemic, arboreous *Hesperomannia* in the distant Sandwich Islands. On the other hand, the remarkable Cichoriaceous Juan Fernandez genus *Dendroseris* has no near relative in Chili, where the tribe is sparsely represented. With regard to the very distinct Tahitian genus *Fitchia*, Sir Joseph Hooker acquiesces in the propriety of placing it in the Helianthoideæ rather than the Cichoriaceæ, in spite of its ligulate flowers. The occurrence of arboreous Compositæ in so many remote oceanic islands, coupled with the distribution of the genera to which they bear the greatest affinity, seems to indicate that they are the remains of very ancient types. We have not discussed the probabilities of differentiation on the spot, because, even assuming that to have happened, the difficulties connected with the great isolation of the insular types and their nearest continental affinities have still to be met. The question by what means the ancestors of these Compositæ were conveyed to the islands—and unless a former continental connection be supposed, conveyance from a continent seems the inevitable conclusion—can only be conjecturally answered. Most of the Compositæ are provided with exceptionally favourable means of dispersion in their light pappose achenes, though perhaps not for conveyance over immense expanses of the ocean; but we have yet much to learn on this point. Wind seems at first the most probable agent; but an uninterrupted current of air necessary for the purpose is hardly imaginable; and then, it might be asked, why has the agency, whatever it was, ceased acting? and why have its operations been limited to the conveyance of seeds to the islands? why not from the islands as well?

South Trinidad.—This island was covered, in parts at least, with wood, even as late as the middle of the present century. Now the trees are all, or nearly all, prostrate and dead; and the living vegetation, as far as known, is restricted to about a dozen species of flowering plants and ferns; but it has not been explored by a botanist. Independently of the existing vegetation, it would be interesting to ascertain the relationship of the trees which formerly clothed the hill-sides. The few plants known are distinctly Brazilian in character, with the exception of one fern, which had previously only been collected in St Helena.

Tristan da Cunha Group, and St Paul and Amsterdam Islands.—These two distant groups are coupled, because, as already explained, the plants forming the mass of the vegetation are of the same species in both cases. They are only two in number. One is a stout reed (*Spartina arundinacea*), which is confined to these islands, and has its nearest ally in a South-eastern American species; and the other is *Phylica nitida*, a shrub or small tree, also found in the Mascarene Islands, and belonging to a genus numerously represented in Extratropical South Africa, with a few species in Madagascar, and one endemic species in St Helena, and unknown elsewhere. The distribution of *Phylica nitida* is specially remarkable, inasmuch as it is unknown in Africa, and perhaps as nearly related to the St Helena species as any. The small number of other flowering plants in these two groups of islands consists partly of endemic species of genera more or less widely diffused in the south temperate zone or beyond, and partly of species of wider range.

The Chain of Islands from the Prince Edward Group to the Macdonald Group.—From our analysis of the distribution of the vascular plants found in these islands (Part II., p. 250), it will be seen, that in spite of the great distances separating the groups, the vegetation is essentially the same throughout, and a part of that characteristic of the coldest southern region of flowering plants generally. These facts, considered in relation to the means by which the plants might be dispersed, all point to a former great land-connection, and this is the view taken by Sir Joseph Hooker and Mr Moseley. Further, the fuller details of the Antarctic Flora a few pages back confirm the close relationship existing between the vegetation of the most distant points of the coldest southern region. The Antarctic drift and other agencies may possibly have conveyed the seeds of the plants growing in the chain of islands under consideration. Wallace employs all the evidence adducible to prove a former land-connection between New Zealand and Australia by way of Lord Howe's Island, and doubtless his arguments are sound; but he is content, perhaps from having less deeply studied this part of the subject, with a comparatively broken connection with America to account for the American element in New Zealand. The extreme poverty of the present vegetation of the islands in the South Indian Ocean might be put forward as an argument in favour of original isolation; but the evidence of

the vegetation of the past, slight as it is, favours the opposite view. Fossil wood has been found in the Crozets and Kerguelen; and specimens brought from the latter island by Sir Joseph Hooker and others were regarded by the late Dr Gœppert as being related to *Araucaria*, and he named them *Araucarites schleinitzii*, and *Araucarites hookeri*.

Juan Fernandez and Masafuera.—This little flora is as remarkable for what it does not contain as for what it does contain. Apart from the Compositæ, mentioned above under St Helena, the flora is essentially Chilian in character, a large proportion of the endemic element being species of genera also represented in Chili; yet the large characteristic Chilian genera of Leguminosæ, Compositæ, Orchideæ, &c., are entirely absent from the islands. The Boragineous genus *Selkirkia* has, however, no great affinity with any Chilian member of the order, and *Lactoris* is altogether an isolated type of a tribe of Piperaceæ.

The South-eastern Moluccas.—So far as we know, the vegetation of these islands contains only a very small endemic element, though larger than that in the Bermudas. Dr Beccari, who has more thoroughly explored the botany of the Arrou Islands than Mr Moseley was able to, describes it as exceedingly poor and wholly Papuan; and he finds evidence of a comparatively recent connection with New Guinea.

The Admiralty Islands.—The fragment of the flora of this group on the extreme western edge of Polynesia, collected by Mr Moseley, shows, as might be expected, that the vegetation is intermediate in character between the Malayan and Polynesian. In Polynesia, as elsewhere, the Compositæ more particularly are perplexing to the botanical geographer, for although they have their greatest affinities in America, as well as the subarboreous Lobeliaceæ, so numerous in the Sandwich Islands, yet the bulk of the vegetation seems to have been derived from the Australo-Asiatic region. As suggested before, perhaps the arboreous Compositæ are older than the other constituents of the vegetation. The Australasian genus *Metrosideros* penetrates as far eastward as Pitcairn, where, as in the Sandwich Islands, it forms large woods; and the prominence of such other Australasian or Asiatic genera in the Sandwich Islands as *Pittosporum*, *Alphitonia*, *Cyathodes*, *Scævola*, and *Cyrtandra* is noteworthy. On the other hand, the peculiar Sandwich Island types seem to have had a former wider extension, as is indicated by the Lobeliaceous arboreous genus *Sclerotheca* and a species of *Phyllostegia* in Tahiti.

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The present list is not offered as an exhaustive one of the literature dealing with our subject, for it was only an afterthought to include it; but we hope we have not overlooked any work of importance, as there was no intention of making a selection. The titles of a number of minor and subsidiary works referred to, or from which extracts are given in the Introductory Notes to the vegetation of the various islands, are not repeated here, because it seemed wholly unnecessary.

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THE

VOYAGE OF H.M.S. CHALLENGER.

BOTANY.

REPORT on the BOTANY OF THE BERMUDAS and various other ISLANDS of the ATLANTIC and SOUTHERN OCEANS. By W. BOTTING HEMSLEY, A.L.S.

THE BERMUDAS.

INTRODUCTORY NOTES.

PHYSICAL CONDITIONS OF THE ISLANDS.

THE Bermudas consist of an irregular chain of islets twenty-five miles long and somewhat in the form of the letter J; and, without counting the smaller rocks, they number about one hundred, lying in the Western Atlantic, between 32° 14′ and 32° 23′ N. latitude, and 64° 38′ and 64° 53′ W. longitude, thus being nearly 580 nautical miles from the nearest land, Cape Hatteras in North Carolina. The principal islets are so close together that there is continuous communication by bridges from St George Island in the north to Somerset Island, nearly at the extremity of the curve at the other end of the chain. Bermuda itself, the largest island, is nowhere more than three miles across, and the highest land in the group does not exceed 250 feet above the level of the sea. The coast is either rocky, presenting an irregular surface of weather-worn calcareous sandstone, or sandy, the sand being blown up into dunes covering extensive tracts. In the interior hollows are peat-bogs or marshes of considerable area; yet there is nowhere a running stream, or even so much as a permanent pond or pool. It has been stated [1] that there is not a trace of a stream or pool, or even of a ditch, the rain sinking through the soil where it falls as it might through a sieve; but it must be otherwise at certain seasons, for Mr Moseley [2] says that sheets of shallow water, sometimes as much as a quarter of a mile long, occur in some of the valleys and hollows inland. Several of them were passed on the road from Hamilton to Somerset Island.

[1] Sir Wyville Thomson in *Nature*, vol. viii. p. 267.

[2] *Journ. Linn. Soc. Lond.*, vol. xiv. p. 319.

Some of these ponds adjoined peat-marshes, yet their water was not at all peaty. In the water of several no salt was perceptible to the taste, but Mr Moseley was informed that they were salter at certain seasons.

The islands are wholly built up of a calcareous limestone of varying degrees of hardness, and there are numerous caves, those of Paynter's Vale being the most noteworthy, and the most interesting to the botanist, as it is among them that the greatest variety of plants is found. One of the features of the islands is the moving coral sand of the flat parts of the coast. Where it is not bound by the roots of vegetation it gradually moves onwards, burying all before it.

Climate.

Owing to their geographical position the Bermudas have a climate of very equable temperature, varying in the colder months from 55° to 70° Fahr.; but the heat of the summer months is very oppressive on account of the excessive moisture of a prevailing tropical wind. The following table of the mean monthly temperatures compiled by Sir J. H. Lefroy, will give some idea of the climate:—

	Fahr.		Fahr.
January	63·4°	July	80°
February	63°	August	81·7°
March	63·4°	September	79·8°
April	66·5°	October	73·7°
May	70·4°	November	68°
June	76°	December	64·5°

From this it will be seen that the winter temperature is about equal to the mean summer temperature of the British Islands, and the mean annual temperature reaches 70·9° Fahr. The minimum winter temperature is rarely below 50° Fahr. On the whole, the winter climate is agreeable, though storms are not infrequent and sometimes disastrous.

Vegetation—Historical Sketch.

The earliest reference to the vegetation of the Bermudas that we have seen is by Henry May,[1] who was accommodated with a passage home from the West Indies in a French man-of-war, commanded by Charles de la Barbotiere. On the 17th December 1593 this ship was wrecked on the north-west part of the "Isle of Bermuda." May says: "This island is divided all into broken islands; and the greatest part I was upon, which might be some four or five miles long and two miles and a half over, being all woods, as cedar [*Juniperus bermudiana*] and other timber; but cedar is the chiefest." Having

[1] Hakluyt's Collection of the Early Voyages, Travels, and Discoveries of the English Nation. New edition, 1811, vol. iv. p. 55.

saved their carpenter's tools from the wreck, they built a bark, presumably of the cedar-wood, "of some eighteen tun," wherewith they left the islands, after a sojourn of five months. May also states that there were hogs in the south part; but they were so lean, "by reason the island is so barren," that they could not eat them. Fresh water could only be procured by digging. Unfortunately our author does not mention how they subsisted during the five months they (twenty-six in number) lived there, though chiefly, no doubt, on the "fish, fowl, and tortoise, of which there was good store."

Our next source of information is S. Jourdan,[1] who was on board the "Sea Venture," commanded by Sir George Sommers, which was wrecked on the coast of the Bermudas in 1609. At that date the hogs were so abundant that Sir George Sommers killed thirty-two on one hunting excursion. Hence it would appear that the islands must have been exceptionally bare of herbage when May was there. Respecting the vegetable productions of the country, Jourdan is more explicit than May, and we are able from his account to recognise several of the elements of the present flora. After descanting on the abundance and good quality of the animal food afforded by the islands, he proceeds: "The country yeeldeth divers fruits, as prickled peares [*Opuntia* spp.] in great abundance, which continue greene upon the trees all the yeare; also great plenty of mulberries [*Conocarpus erectus?*], white and red; and on the same are great store of silke-wormes [these turned out to be spiders], which yeelde tods of silke, both white and yellow, being some course and some fine. And there is a tree called a palmito tree [*Sabal blackburniana*] which hath a very sweete berry, upon which the hogs doe most feede; but our men finding the sweetnesse of them, did willingly share with the hogs for them, they being very pleasant and wholsome, which made them carelesse almost of any bread with their meate; which occasioned us to carry in a manner all that store of flower and meale we did or could save for Virginia. The head of the palmito tree is very good meate, either raw or sodden. It yeeldeth a head which weigheth about twenty pounds, and is farre better meate then any cabbidge. There are an infinite number of cedar trees [*Juniperus bermudiana*] (the fairest I thinke in the world), and those bring forth a very sweet berry and wholsom to eate. The country (for as much as I could find myself, or heare by others) affords no venimous creature or so much as a rat or a mouse, or anything unwholesome."

The foregoing extract establishes some interesting facts concerning the presence and preponderance at that date of four or five plants, namely, *Conocarpus*, *Opuntia*, *Juniperus*, and *Sabal*, which still constitute the more conspicuous features of the vegetation.

Jourdan also alludes to the protection afforded by trees to shipping in a harbour entered from the south-east side. Farther on he says that he had almost omitted through forgetfulness to mention that they found very good tobacco. We can only suppose that he mistook

[1] A Discovery of the Barmudas, otherwise called the Isle of Divels, by Sir Thomas Gates, Sir George Sommers, and Captayne Newport, with divers others. Set forth for the love of my Country and also for the good of the Plantation in Virginia. Sib Jourdan. London, 1610. Hakluyt's Coll., vol. v. p. 551.

some other plant for the true tobacco; for although tobacco was subsequently extensively cultivated for a number of years, it has not apparently survived as a colonist. Jones, however (Proc. and Trans. Nov. Scot. Inst. Nat. Sc., 1873, p. 266), mentions that he was informed that tobacco plants are sure to spring up where old stone walls are taken down.

In the Historye of the Bermudaes or Summer Islands, edited by General Sir J. Henry Lefroy, there is early mention (p. 3) of some of the principal vegetable productions of the islands, notably of the "many tall and goodly cæders, infinite store of palmitoes and numbers of mulbery trees." There is also a good description of the prickly pear, and the "wild olive" is frequently mentioned. Whether this was the European olive run wild, or the native shrub (*Forestiera porulosa*) belonging to the same natural order, is uncertain. Another interesting fact is the reference to the "poisonous weed" [*Rhus toxicodendron*], showing that it is not a plant of recent introduction. The description of it is unmistakable.

Between these early records and the beginning of the present century we have gleaned no information of importance or interest on the vegetation of the Bermudas. Indeed, the botanical history of the islands may be said to have begun in 1806, when François André Michaux visited them. The American vessel in which he had taken a passage to the United States for the purpose of collecting seeds of forest trees for the French Government was seized by the commander of the British man-of-war "Leander," and Michaux, the only passenger, was taken on board the latter vessel. She put into the Bermudas for water, and during her stay of a week Michaux was permitted to land; and he took advantage of the opportunity to study the vegetation, subsequently publishing[1] the results of his observations, the substance of which is worth reproducing here, as the earliest notice of the vegetation of the islands by a botanist. It was written on board the "Leander" on her way from the Bermudas to Halifax; hence it is necessarily imperfect, and in some points inaccurate. St George was the only island traversed by Michaux, and what follows relates to that alone.

Three parts of the island were covered with wood; the rest was partly cultivated and partly so barren as to be uncultivable. The plants natural to the country were little varied, and although Michaux made only a few hasty walks, he believed that he could state with some degree of certainty that the number of species did not exceed 140 or 150. "Among these plants," he says, "we find several of the Old World which have not the appearance of having been carried thither, such are *Verbascum thapsus, Anagallis arvensis, Mercurialis annua, Leontodon Taraxacum, Plantago major, Urtica urens, Gentiana nana, Oxalis acetosella*,[2] &c." Michaux further notes the palmetto, the poison vine, the sage-bushes (*Lantana* spp.), a pretty verbena, and a small *Medicago*. The last was the commonest

[1] Notice sur les Isles Bermudes, et particulièrement sur l'Isle Saint Georges, in *Annales du Muséum d'Histoire Naturelle*, Paris, 1806, t. viii. pp. 356–364.

[2] The two last names were almost certainly written without thought, and probably for *Erythræa* and *Oxalis corniculata*.

plant in the country, each plant occupying scarcely a square inch of ground; but they were so numerous that they completely carpeted the surface in many places, grasses being almost entirely absent.

It is interesting to read what he has to say concerning the cedar (*Juniperus*) at that date. The islands, he says, were covered with it, growing in all kinds of soils and situations, but most vigorously in the valleys, where it attained a height of 40 to 50 feet, with a trunk up to 15 inches in diameter. On the heights and in places where it had been cut down, it was springing up again spontaneously.

One more fact in connection with this date is worth mentioning: according to Michaux, the flourishing agriculture of earlier times had dwindled down to nothing.

Present Condition of the Vegetation.

With the exception of a few odd specimens preserved in the Sloane Collection[1] at the British Museum, the following enumeration of the plants of the Bermudas is entirely based upon specimens and data collected within the last forty or fifty years. The plants in the Sloane Herbarium were collected by a Mr John Dickinson,[2] and originally belonged, it would seem, to Petiver, who presented them to Plukenet, and through him they came into the possession of Sloane. They are—*Triumfetta lappula*, *Melilotus parviflora*, *Conocarpus erectus*, *Eupatorium macrophyllum*, *Erigeron canadense*, *Erigeron linifolius*, *Erigeron darrellianus*, *Verbena urticæfolia*, *Euphorbia buxifolia*, *Myrica cerifera*, *Sisyrinchium bermudiana*, and *Carex bermudiana*. The last-named plant, which appears to be endemic in the islands, we have seen from no other source; *Erigeron darrellianus* is also apparently endemic, and, like the *Carex*, had lain undetermined until we described it.

The modern collections to which we have had access are, if we except a few flowering plants sent by Sir W. J. Reid, the Rev. C. J. Johns, and Mr J. F. Holton, and a few ferns by Mr Farlow, only three in number. First, a collection made by A. W. Lane, Esq., before 1845, a set of which was acquired by the late Sir William Hooker, and is now in the National Collection at Kew. Among other documents relating to the flora of the Bermudas for which we are indebted to Sir J. H. Lefroy is a copy of a List of the Native Plants of Bermuda, compiled by A. W. Lane, Esq., of H.M.S. "Illustrious," and presented to the Bermuda Library by Sir W. J. Reid, 8th July 1845. This list includes 127 species, a large proportion of which we regard as indigenous. The set at Kew is not quite complete. Secondly, there are the plants collected from time to time by Sir J. H. Lefroy, and sent to Kew for identification. These are numerous, as the frequent recurrence of his name in the enumeration testifies; and they embrace several species not sent by any other collector, and

[1] We have to thank Mr Carruthers and Mr Britten, of the British Museum, for the great trouble they have taken in searching the volumes of the Sloane Herbarium for plants coming within the scope of this work.

[2] Petiver in his Musei Petiveriani, Centuria Octava, p. 80, alludes to him as follows: "To Mr John Dickinson I am obliged for some plants he lately sent me from Bermudas (besides other collections some years ago), with assurances of larger performances."

not included in Dr Rein's list, to which we shall have occasion to refer again. Thirdly, the collection made by Mr Moseley, which consisted of about 160 species of flowering plants and ferns, besides a considerable number of algæ and other cryptogams.[1]

We may now briefly examine the literature on the vegetation of the islands which has been published since Michaux's sketch at the beginning of the century. In 1859 Mr J. M. Jones published a little work[2] on the natural history and meteorology of the Bermudas. The botany is perhaps the weakest point; still it contains some interesting notes on certain plants which we have considered worth reproducing. In 1873 the same writer published[3] a fuller account of the plants, wild and cultivated, in the islands. This has the same defects as the original enumeration; but its merits are greater, inasmuch as it was based on a list drawn up by Sir J. H. Lefroy, chiefly from the names of plants furnished him by the authorities at Kew. In the previous year, 1872, Sir J. H. Lefroy had privately printed a list of all the plants known to exist in the islands, including single specimens in his own greenhouse. A copy of this list, lent by Sir J. H. Lefroy, with numerous manuscript emendations and additional information on the habitats of the wild plants, has been of the greatest service to us. Another account of the botany of the Bermudas appeared in 1873,[4] the author being the eminent traveller and scholar, Dr J. J. Rein, and his contribution to the subject has a special value. He resided some time in the islands and made a collection of 128 vascular plants belonging to fifty-six natural orders, besides a considerable number of algæ. The vascular plants were determined by the late Dr Grisebach, the author of the Flora of the British West Indies, and the late Dr W. H. Harvey verified Dr Rein's names of the algæ; therefore they may be regarded as reliable. Indeed, with two or three unimportant exceptions, the species enumerated in his list are the same as we have seen in other collections. Finally, there are Mr Moseley's Notes on the Vegetation of Burmuda.[5] From these various sources, aided by the photographs of the Expedition, and some others kindly forwarded to us by Mr Heyl of Hamilton, Bermuda, we are able to give a fair description of the aspects of the vegetation, and in all probability an almost complete enumeration of the species constituting the present flora of the islands.

The one striking feature in the softly undulating landscape is the ubiquitous cedar, relieved here and there by clusters and isolated individuals of the palmetto. Before discussing the less prominent features of the flora we will examine its composition as a

[1] Just as we were on the point of going to press we received a collection of Bermuda plants made by Mr Oswald A. Reade of the Royal Naval Hospital, Bermuda, and kindly communicated by him for the purposes of this work. It contained a large proportion of the plants in our enumeration, and, besides a few evidently introduced species not included by us, there was one additional indigenous grass, namely, *Spartina juncea*.

[2] The Naturalist in Bermuda: A Sketch of the Geology, Zoology, and Botany of that remarkable Group of Islands, by John Mathew Jones, Esq.

[3] *Proceedings and Transactions of the Nova Scotia Institute of Natural Science*, October 1873.

[4] Ueber die Vegetations-Verhältnisse der Bermudas-Inseln, Vortrag gehalten beim Jahresfeste der Senckenb. Naturf.-Gesellsch., 1873. *Bericht der Senckenb. Naturf.-Gesellsch.*, 1873, pp. 131–153. Dr J. J. Rein.

[5] *Journ. Linn. Soc. Lond.*, vol. xiv. pp. 317–321.

whole. It should be explained here that most likely some species included in the category of probably indigenous[1] have no claim to that position, while a few others, which from want of evidence have been placed among the more numerous introduced element, are indigenous in the sense explained below.

TABLE *Showing the Composition of the Wild Flora of the Bermudas.*[2]

Orders.	Genera.	Species.		Orders.	Genera.	Species.	
		Total.	Probably Indigenous.			Total.	Probably Indigenous.
1. Ranunculaceæ	1	2	...	41. Apocynaceæ	1	1	...
2. Papavaraceæ	2	2	...	42. Asclepiadeæ	1	1	...
3. Fumariaceæ	1	2	...	43. Loganiaceæ	1	1	...
4. Cruciferæ	10	11	1	44. Gentianeæ	1	1	...
5. Caryophyllaceæ	3	5	1	45. Hydrophyllaceæ	1	1	1
6. Portulaceæ	2	2	1	46. Boragineæ	2	2	2
7. Tamariscineæ	1	1	...	47. Convolvulaceæ	3	9	7
8. Hypericineæ	1	1	1	48. Solanaceæ	5	7	...
9. Guttiferæ	1	1	...	49. Scrophularineæ	6	9	1
10. Malvaceæ	7	9	4	50. Bignoniaceæ	1	1	...
11. Sterculiaceæ	1	1	...	51. Verbenaceæ	8	10	6
12. Tiliaceæ	2	4	2	52. Labiatæ	8	10	...
13. Geraniaceæ	2	3	...	53. Plantaginaceæ	1	3	...
14. Linaceæ	1	1	...	54. Nyctagineæ	2	2	...
15. Aurantiaceæ	1	2	...	55. Amarantaceæ	1	2	...
16. Simarubeæ	1	1	1	56. Chenopodiaceæ	4	5	2
17. Meliaceæ	2	2	...	57. Polygonaceæ	3	4	2
18. Ilicineæ	1	1	...	58. Piperaceæ	1	1	1
19. Celastrineæ	1	1	1	59. Euphorbiaceæ	6	11	2
20. Ampelideæ	1	1	1	60. Urticaceæ	6	10	6
21. Sapindaceæ	3	4	3	61. Myricaceæ	1	1	1
22. Anacardiaceæ	1	1	1	62. Ceratophylleæ	1	1	1
23. Leguminosæ	15	20	6	63. Orchideæ	1	1	1
24. Crassulaceæ	1	1	...	64. Amaryllideæ	2	2	...
25. Rhizophoreæ	1	1	1	65. Irideæ	1	1	1
26. Combretaceæ	1	1	1	66. Liliaceæ	2	3	...
27. Myrtaceæ	3	3	1	67. Commelinaceæ	1	1	1
28. Onagrarieæ	3	4	1	68. Juncaceæ	1	2	2
29. Passifloreæ	1	1	...	69. Palmeæ	1	1	1
30. Cucurbitaceæ	1	1	...	70. Typhaceæ	1	1	1
31. Cactaceæ	1	4	2	71. Lemnaceæ	1	2	2
32. Ficoideæ	1	1	1	72. Naiadaceæ	2	2	2
33. Umbelliferæ	8	10	2	73. Cyperaceæ	8	15	15
34. Rubiaceæ	10	11	6	74. Gramineæ	16	24	9
35. Valerianeæ	2	2	...	75. Coniferæ	1	1	1
36. Compositæ	17	29	11	76. Lycopodiaceæ	1	1	1
37. Goodenovieæ	1	1	1	77. Equisetaceæ	1	1	1
38. Plumbagineæ	1	1	1	78. Filices	10	22	22
39. Primulaceæ	1	1	...				
40. Oleaceæ	3	3	1	Totals	231	326	144

[1] Any plant that appears to have reached the island independently of the direct or indirect agency of man is treated as indigenous, even such as are of quite casual occurrence.

[2] Restricted to the vascular plants.

In a flora of 326 species, belonging to 231 genera and 78 orders, there is a probably indigenous element, consisting of 144 species, belonging to 109 genera and 50 orders.[1]

A further analysis of this indigenous element yields the following statistics :—

	Orders.	Genera.	Species.
Dictyledons	37	74	85
Monocotyledons	10	23	35
Vascular Cryptogams	3	12	24
	50	109	144

The remarkably large proportion of orders and genera represented by the 145 probably indigenous species is interesting. Similar proportions exist in most of the other islands and islets whose vegetation is dealt with in this work; indeed, a large ordinal and generic diversity is a characteristic of insular floras. A parallel is offered on the eastern side of the Atlantic by the flora of the Azores, where, in a total area of about 700 square miles, only 478 species have been collected, and these represent eighty orders, or an average of six species to an order. The average for all Europe, according to Watson,[2] is seventy-four species to the order; and for the British Islands, between fourteen and fifteen species. On the other hand, the proportions of orders and genera to species in the flora of North America, especially of Eastern, are widely different, whether we take the Northern or the Southern States. Thus a rough calculation of the flora of the area covered by Gray's Manual gives less than twenty species to an order.

A glance at the general geographical distribution of the species forming the flora of the Bermudas, as set forth in the following table, is sufficient to enable us to point to its origin.

[1] The Bermudan cellular cryptogams are still imperfectly known. Including a few endemic species, the following are the numbers in this work :—

	Species.
Musci	8
Hepaticæ	6
Lichenes	31
Fungi	24
Algæ	132
Total	201

[2] In Godman's Natural History of the Azores, p. 265.

Tabular View of the Geographical Distribution of the Vascular Plants probably Indigenous in the Bermudas.

Name.	General Geographical Distribution.				Name.	General Geographical Distribution.			
	South-Eastern N. America.	West Indies.	Widely Dispersed.	Specially Littoral.		South-Eastern N. America.	West Indies.	Widely Dispersed.	Specially Littoral.
Cakile æqualis	×	×	...	×	Tournefortia gnaphalodes	×	×	...	×
Arenaria alsinoides	×	×	...	...	Heliotropium curassavicum	×	×	...	...
Montia fontana	...	...	×	...	Ipomœa jamaicensis	...	×	...	...
Ascyrum hypericoides	...	×	...	...	Ipomœa acuminata	...	×	...	...
Sida carpinifolia	×	×	×	...	Ipomœa pes-capræ	×	×	×	×
Modiola multifida	×	×	...	...	Ipomœa sagittata	×	...	...	...
Kosteletzkya virginica	×	...	...	...	Ipomœa villosa	...	×	...	...
Hibiscus tiliaceus	×	×	×	×	Convolvulus jamaicensis	...	×	...	...
Triumfetta semitriloba	×	×	×	...	Dichondra repens	×	×	×	...
Waltheria americana	×	×	×	...	Herpestis monniera	×	×	×	...
Suriana maritima	×	×	×	×	Phryma leptostachya	×	...	...	...
Elæodendron xylocarpum	...	×	...	...	Lippia nodiflora	×	×	×	...
Ampelopsis quinquefolia	×	...	...	...	Stachytarpheta jamaicensis	×	×	...	...
Cardiospermum halicacabum	×	×	×	...	Priva echinata	×	×	...	...
Sapindus saponaria	...	×	...	...	Duranta plumieri	×	×	...	...
Dodonæa viscosa	×	×	×	...	Avicennia nitida	×	×	...	...
Rhus toxicodendron	×	...	...	...	Atriplex cristata	...	×	...	...
Centrosema virginianum	×	×	...	...	Salicornia ambigua	×	×	...	×
Sophora tomentosa	×	×	...	×	Polygonum acre	×	×	...	...
Vigna luteola	×	×	...	×	Coccoloba uvifera	×	×	...	...
Canavalia obtusifolia	×	×	×	×	Peperomia magnoliæfolia	...	×	...	...
Desmanthus virgatus	×	×	...	...	Euphorbia buxifolia	×	×	...	×
Leucæna glauca	×	×	×	...	Croton maritimus	×	×	...	×
Conocarpus erectus	×	×	...	×	Celtis occidentalis	×	...	...	...
Rhizophora mangle	×	×	...	×	Urtica chamædryoides	×	...	...	...
Eugenia monticola	×	×	...	...	Bœhmeria cylindrica	×	×	...	...
Ludwigia repens	×	×	...	...	Parietaria debilis	×	×	×	...
Opuntia pes-corvi[1]	×	...	...	...	Parietaria pennsylvanica	×	...	...	...
Opuntia ficus-indica	×	×	...	...	Pilea microphylla	×	×	...	...
Sesuvium portulacastrum	×	×	×	×	Myrica cerifera	×	×	...	...
Hydrocotyle asiatica	×	×	×	...	Ceratophyllum demersum	×	×	×	...
Hydrocotyle umbellata	×	×	...	...	Juniperus bermudiana	...	×	...	...
Rhachicallis rupestris	...	×	...	...	Spiranthes tortilis	...	×	...	...
Randia aculeata	×	×	...	...	Sisyrinchium bermudiana	...	...	...	...
Chiococca racemosa	×	×	...	...	Commelina nudiflora	×	×	×	...
Morinda royoc	×	×	...	...	Juncus tenuis	×	×	...	...
Psychotria undata	×	×	...	...	Juncus marginatus	×	...	...	...
Galium uniflorum	×	...	...	...	Sabal blackburniana	...	...	...	...
Eupatorium fœniculaceum	×	...	...	...	Typha angustifolia	...	×	×	...
Solidago sempervirens	×	...	...	...	Lemna minor	×	×	×	...
Solidago stricta	×	...	...	...	Lemna trisulca	...	×	×	...
Erigeron darrellianus	...	...	...	...	Ruppia maritima	×	×	×	...
Baccharis glomeruliflora	×	...	...	...	Zostera marina	×	...	×	...
Pluchea odorata	×	×	...	...	Cyperus odoratus	...	×	...	...
Pluchea purpurascens	×	×	...	...	Cyperus rotundus	...	×	×	...
Pluchea camphorata	×	...	...	...	Kyllinga monocephala	×	×	×	...
Eclipta erecta	×	×	...	...	Heleocharis capitata	×	×	×	...
Borrichia arborescens	×	×	...	×	Heleocharis melanocarpa	×	...	...	...
Borrichia frutescens	×	×	...	×	Heleocharis plantaginea	×	×	...	...
Scævola lobelia	×	×	×	×	Dichromena leucocephala	×	×	...	...
Statice lefroyi	...	...	...	...	Dichromena pura	...	×	...	...
Forestiera porulosa	×	×	...	...	Scirpus lacustris	×	×	...	...
Nama jamaicense	×	×	...	...	Rhynchospora florida	...	×	...	...

[1] Although four species of the genus are included in this enumeration, only two are given here, as it is probable that there are no more than two indigenous.

Name.	General Geographical Distribution.			
	South-Eastern N. America.	West Indies.	Widely Dispersed.	Specially Littoral.
Rhynchospora stipitata	×	...	...	...
Rhynchospora sp.	...	...	...	...
Rhynchospora sp.	...	...	...	...
Cladium mariscus	×	×	×	...
Carex bermudiana	...	...	...	...
Paspalum distichum	×	×	×	...
Paspalum filiforme	×	×	...	...
Paspalum setaceum	×	...	...	...
Cenchrus tribuloides	×	×	×	×
Spartina juncea	×	...	...	...
Stenotaphrum americanum	×	×	×	×
Sporobolus indicus	×	×	×	×
Sporobolus virginicus	×	×	×	×
Chloris petræa	×	×	...	...
Psilotum triquetrum	×	×	×	×
Equisetum sp.	...	...	...	...
Adiantum bellum	...	...	...	...
Pteris aquilina	×	×	×	...
Pteris heterophylla	...	×	...	...

Name.	General Geographical Distribution.			
	South-Eastern N. America.	West Indies.	Widely Dispersed.	Specially Littoral.
Woodwardia virginica	×	×	...	...
Asplenium dentatum	×	×	...	...
Asplenium laffanianum	...	...	...	...
Asplenium rhizophyllum	×	×	×	...
Asplenium trichomanes	×	×	×	...
Aspidium coriaceum	...	×	×	...
Aspidium aculeatum	×	×	×	...
Nephrodium amplum	...	×	...	...
Nephrodium bermudianum	...	...	...	...
Nephrodium patens	×	×	×	...
Nephrodium molle	...	×	×	...
Nephrodium thelypteris	×	...	×	...
Nephrodium villosum	...	×	...	...
Nephrolepis exaltata	×	×	×	...
Polypodium pectinatum	×	×	...	...
Polypodium elasticum	×	×	...	...
Acrostichum aureum	×	×	...	...
Osmunda cinnamomea	×	×	...	...
Osmunda regalis	×	...	×	...

From this table we learn that 109 species of the Bermudan flora also inhabit South-Eastern North America, and within one of the same number inhabit the West Indies. Further, eighty-six of the Bermudan plants are common to the West Indies and continental North America, or at least reach the keys of Florida. It is only a comparatively small number of the eighty-six that does not reach the mainland of Florida, where there is a much greater overlapping of the essentially North American and the West Indian elements than was formerly suspected. A considerable number of the species common to the West Indies and North America are as much at home on the coast of the South-Eastern States as they are in the West Indies; yet the bulk of these are West Indian types, and not found north of Florida on the continent.

To add to these there are twenty-three West Indian species in the Bermudas not hitherto recorded, to our knowledge, from North America. They are:—

Ascyrum hypericoides,[1] *Elæodendron xylocarpum*, *Sapindus saponaria*, *Rhachicallis rupestris*, *Ipomœa jamaicensis*, *Ipomœa acuminata*, *Ipomœa villosa*, *Convolvulus jamaicensis*, *Atriplex cristata*, *Peperomia magnoliæfolia*, *Juniperus bermudiana*, *Spiranthes tortilis*, *Typha angustifolia*, *Lemna trisulca*, *Cyperus odoratus*, *Cyperus rotundus*, *Dichromena pura*, *Rhynchospora florida*, *Pteris heterophylla*, *Aspidium coriaceum*, *Nephrodium amplum*, *Nephrodium molle*, *Nephrodium villosum*.

Most of the foregoing are represented in North America by closely allied species, and some of them may yet be discovered in Florida. *Sapindus saponaria* is recorded by Sir J. H. Lefroy as having sprung up from seed cast ashore in the Bermudas. The most note-

[1] Represented in South-Eastern North America by the closely allied *Ascyrum crux-andreæ*.

worthy plants in the above list, because they are as much indigenous as any of the plants, are *Elæodendron*, *Rhachicallis*, *Juniperus*, and the *Spiranthes*, to which might be added, perhaps, the *Atriplex* and the *Peperomia*. *Rhachicallis* is a very singular little shrub, inhabiting rocky sea-shores from Cuba and Jamaica to the Bahamas; and it is one of the characteristic plants of the Bermudan flora. The most remarkable plant, however, is the orchid, *Spiranthes*. Orchids are exceedingly rare in remote islands and islets, and much rarer, generally speaking, in islands nearer continents than on the continents themselves; and this is the only one with which we have to deal in the vegetation of the islands of the Atlantic and South Indian Oceans. In the Azores there are only three species, two of which are endemic.

From the figures given in the preceding table it will be seen that there is an equal number (twenty-three) of North American plants which are apparently indigenous in the Bermudas, but do not extend to the West Indies. These are :—

Kosteletzkya virginica, *Ampelopsis quinquefolia*, *Rhus toxicodendron*, *Opuntia pescorvi?* *Galium uniflorum*, *Eupatorium fœniculaceum*, *Solidago sempervirens*, *Solidago stricta*, *Baccharis glomeruliflora*, *Pluchea camphorata*, *Ipomœa sagittata*, *Phryma leptostachya*, *Celtis occidentalis*, *Urtica chamædryoides*, *Parietaria pennsylvanica*, *Juncus marginatus*, *Zostera marina?* *Heleocharis melanocarpa*, *Rhynchospora stipitata*,[1] *Paspalum setaceum*, *Woodwardia virginica*, *Nephrodium thelypteris*, and *Osmunda regalis*.

This North American element in the flora may be partly due to the agency of man; but the majority of the species inhabit salt marshes and the sea-shore of the mainland, and similar situations in the islands. *Rhus toxicodendron* is one of the plants mentioned by the earliest visitors as inhabiting the islands; and the *Baccharis*, *Pluchea*, *Juncus*, *Heleocharis*, *Rhynchospora*, and the ferns are all plants unlikely to have been introduced by man, either accidentally or purposely. Besides, the localities in which they occur point to their being truly indigenous.

Widely Dispersed Species.

Of the 144 species comprising the indigenous flora, some forty-six are widely dispersed, by which is meant that, independently of their distribution in the New World, they extend to some part of the Old. Many of them are generally diffused in warm regions, especially the purely maritime plants. There can be no doubt that many of the latter class owe their present wide range to the action of the sea itself.

Endemic Plants.

As compared with other islands in similar and different latitudes and similarly situated in relation to the nearest continents, the flora of the Bermudas is singularly poor in

[1] A plant only recently discovered in Florida, and described in the Supplement to Chapman's Flora of the Southern United States.

endemic species. This peculiarity, it is true, is almost as strikingly exemplified in the flora of the Azores, the nearest of which is about 900 miles distant from the mainland of Western Europe. In this flora of 478 species, only thirty-nine, or about one-twelfth, are endemic; and most of these, like the Bermudan endemic species, are so closely allied to continental ones that they may be regarded as derivatives of them. About half-a-dozen of them are more closely related to Madeiran species than European; and one only, the very rare *Campanula vidalii*, is so very distinct from all other known species as to suggest the possibility of its being the remains of a more ancient flora. One, *Solidago azorica*, proves to be identical with *Solidago sempervirens*, a native of the east coast of North America, and apparently indigenous in the Bermudas. In the following enumeration we have entered into the details of the distribution of this plant; and although it was cultivated in Europe in Linnæus's time, and may possibly have been introduced into the Azores, we are of opinion that the probabilities of its being indigenous are at least as great as those of *Eriocaulon septangulare*, *Spiranthes romanzoviana*, and one or two other, otherwise exclusively North American plants, being indigenous in Ireland. Moreover, there is a similar instance in the South Atlantic. Thus *Asplenium compressum*, which was formerly supposed to be endemic in St Helena, was one of the few plants collected by Dr Copeland in South Trinidad during a short excursion in the island in 1873.[1]

The endemic element in the flora of the Bermudas, as far as it is at present known, is limited to eight species, namely, *Erigeron darrellianus*, *Statice lefroyi*, *Sisyrinchium bermudiana*, *Sabal blackburniana? Carex bermudiana*, *Adiantum bellum*, *Asplenium laffanianum* and *Nephrodium bermudianum*. In the body of the work, the affinities, &c., of each species are fully discussed, and it is shown that closely allied species inhabit either South-Eastern North America or the West Indies. It is still uncertain whether the palm (*Sabal*) is endemic or common to some of the West Indian Islands. The only indication of a possibly older flora is offered by the *Carex*, which is most nearly related to the endemic species of the Island of St Helena. Only one imperfect specimen of it has been seen, however, and that was collected by J. Dickinson about the year 1699. Thus it will be seen that we have similar characteristics in the flora of the volcanic Azores and the coralline Bermudas.

Indigenous Plants Prominent in the Present Vegetation of the Islands.

Already allusion has been made to the all-pervading cedar (*Juniperus*), and its prominent though by far less numerously represented associate, the palmetto (*Sabal*). Next to the cedar some of the introduced plants are certainly more conspicuous and more generally diffused than any of the other indigenous species, and only a small number of the latter are really abundant. From documentary and other evidence the following

[1] What is known of the vegetation of this islet follows the flora of St Helena in this work.

thirty-seven indigenous plants appear to be common, or even abundant, and in little present danger of being overrun and extirpated by the introduced element :—

Cakile æqualis, Sida carpinifolia, Dodonæa viscosa, Rhus toxicodendron, Canavalia obtusifolia, Leucæna glauca, Rhizophora mangle, Conocarpus erectus, Opuntia, Sesuvium portulacastrum, Rhachicallis rupestris, Chiococca racemosa, Borrichia arborescens, Scævola lobelia, Tournefortia gnaphalodes, Ipomæa pes-capræ, Avicennia nitida, Salicornia ambigua, Euphorbia buxifolia, Croton maritimus, Myrica cerifera, Juniperus bermudiana, Sisyrinchium bermudiana, Sabal blackburniana, Typha angustifolia, Cladium mariscus, Cenchrus tribuloides, Spartina juncea, Stenotaphrum americanum, Sporobolus indicus, Sporobolus virginicus, Chloris petræa, Adiantum bellum, Pteris aquilina, Pteris heterophylla, Acrostichum aureum and *Osmunda regalis.*

Of the foregoing plants, those characteristic of the different parts of the coast are :—

Cakile, Dodonæa, Canavalia, Rhizophora, Conocarpus, Sesuvium, Rhachicallis, Chiococca, Borrichia, Scævola, Tournefortia, Ipomæa, Avicennia, Salicornia, Euphorbia, Croton, and several of the grasses, of which *Cenchrus tribuloides* is the commonest, acting as the principal sand-binding plant on the dunes.

Among the commoner plants of the marshes or bays are *Rhus, Myrica, Sisyrinchium, Cladium, Pteris aquilina, Acrostichum aureum,* and *Osmunda regalis.*

Introduced Plants Prominent in the Present Vegetation of the Islands.

In the first rank of this category comes *Lantana camara* and *Lantana involucrata,* the sage bushes of the islanders. Nearly the whole country where uncultivated is covered with a dense growth of these shrubs, which were originally introduced about a century ago to supply firewood. Such vigour and power of spreading do these shrubs possess, that they threaten the extinction of many of the rare indigenous plants. Mr Oswald A. Reade, writing of the vegetation of an undisturbed part of Boaz Island in a recent communication, states that the sage bush and oleander had penetrated there, and were likely soon to overpower the native shrubs in the struggle for existence. The oleander (South-Sea rose of the islander) indeed is a hardly less formidable enemy to the native vegetation than the sage bushes. It grows with extraordinary rapidity in the moister parts of the islands bordering the marshes, &c., but it is also capable of spreading in dry places, where, however, it forms a dwarf much-branched bush.

Of the less destructive, though hardly less common, introduced plants, are *Argemone mexicana, Portulaca oleracea, Oxalis corniculata, Bryophyllum calycinum, Fœniculum vulgare, Ageratum conyzoides, Cichorium intybus, Anagallis arvensis, Asclepias curassavica, Verbascum thapsus, Lippia nodiflora, Stachytarpheta jamaicensis, Salvia coccinea, Plantago major, Plantago lanceolata,* and *Euphorbia* spp.

Concluding Remarks.

From its composition it is evident that the present flora of the Bermudas is of comparatively recent derivation, though not so recent, perhaps, as might at first be supposed. Whence it was derived, the foregoing tables and explanations sufficiently show. Briefly, it is not of purely West Indian origin, but was derived from the West Indies and that region of south-eastern North America where the West Indian and North American types of vegetation overlap each other. Whether it was formerly richer in indigenous, and possibly in endemic species, is problematical; but the extreme rarity of many of the indigenous species at the present time seems to indicate that such may have been the case, though the probability remains of their being casual introductions unable to spread. That the islands were ever clothed with a more ancient flora is unlikely from what has come to light through excavations, dredging, and other operations.

The peat or peaty mud of the marshes consists of the remains of ferns, sedges, and other plants which still inhabit them. It is of great depth in places, and in it are sometimes found trunks of the cedar of a larger size than any of those now growing in the islands. In 1872 Sir J. H. Lefroy, then governor of the islands, caused some borings to be made in Pembroke Marsh, the deepest of which was forty-six feet; and these borings afforded evidence that the peaty mud reached to the limestone bed of the marsh basin. From Mr Oswald A. Reade we learn that a great deal of dredging has lately been done in Hospital Bay; and it is surprising, he says, what a number of trunks of cedar have been brought up, and in such good preservation too, that it would seem the "greater Bermuda" had not been so very long submerged. They were covered with a layer of peat, and over that foraminifera, &c. Under such conditions, of course, the trunks would be almost imperishable.

The means for conveying seeds from the West Indies and Continental America to the Bermudas are so obvious, that it seems almost superfluous to discuss them. From actual observation it is known that seeds cast ashore by the waves have germinated and grown into plants; and the numerous birds that visit the islands can hardly fail to convey seeds in their claws, feathers, or excrement. The seeds or seed-vessels of the majority of the Bermudan plants may be classified in three or four categories—(1.) Large seeds, like many of the *Leguminosæ* and *Ipomœa pes-capræ*, that will bear immersion in sea-water for a considerable period without losing their vitality; (2.) small seeds or seed-vessels, such as the *Cyperaceæ*, some of the *Compositæ*, &c., that might be conveyed in small patches of mud adhering to the claws of marsh birds; (3.) seed-vessels having a fleshy envelope, and containing hard seeds that pass through the alimentary canal of a bird without injury: nearly all the woody plants in the island have seed-vessels or fruits of this kind; (4.) seed-vessels furnished with hooked appendages, by which they become attached to other objects. There are few of the last kind in the Bermudan flora, *Triumfetta* being the

most striking example. Absence of winged fruits, as *Compositæ*, which form so great an element in the North American flora, is remarkable.

A constitutional property exhibited by the only two common woody plants of arboreous habit, the cedar and the palmetto, deserves mentioning, as it accounts for their being able to maintain their preponderance against all comers. It is an extraordinary power of reproduction from seed, rendered certain by the protection of the seed itself—in the one case by an indurated testa, and in the other by an exceedingly dense endosperm. Seed is borne in great abundance and of a high degree of fertility by both; and ground that is left uncultivated is speedily clothed with seedlings of the cedar.

The whole question of the origin of insular floras will be more fully discussed in the general introduction to the Botanical Reports of the Challenger Expedition.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—ANGIOSPERMÆ.

DICOTYLEDONES.—POLYPETALÆ.

RANUNCULACEÆ.

Ranunculus muricatus, Linn.

Ranunculus muricatus, Linn., Sp. Pl., ed. 1, p. 555; Chapm., Fl. Southern U.S., p. 7.

BERMUDAS.—Introduced. Ditches and roadsides—*Lane; Jones; Lefroy; Moseley.*

An annual, common in Southern Europe and some parts of Asia, and now very widely spread as an introduced plant in America, Australia, &c.

Ranunculus parviflorus, Linn.

Ranunculus parviflorus, Linn., Sp. Pl., ed. 2, p. 780; Griseb., Fl. Brit. W. Ind., p. 2.

BERMUDAS.—Introduced. In similar situations to the last—*Lane; Jones; Rein; Lefroy; Moseley.*

This species is also an annual, and is now found in nearly all temperate and sub-tropical countries. They are both weeds of pasture rather than corn-land, and were early introduced into America, whence they may have been carried to the Bermudas.

PAPAVERACEÆ.

Argemone mexicana, Linn.

Argemone mexicana, Linn., Sp. Pl., ed. 1, p. 508; Griseb., Fl. Brit. W. Ind., p. 13; Desc., Fl. Ant., v. t. 380.

BERMUDAS.—Introduced. Very common—*Lane; Jones; Rein; Lefroy; Moseley.*

Annual. Almost universal in warm countries.

Papaver somniferum, Linn.

Papaver somniferum, Linn., Sp. Pl., ed. 1, p. 508; Gray, Manual, ed. 5, p. 59.

BERMUDAS.—Introduced. Occasionally as an escape from cultivation—*Lane; Jones; Lefroy.*

Cultivated and wild in many parts, especially of the Old World, but it is uncertain where it is really indigenous.

In Reade's collection there was a specimen of *Papaver dubium*, Linn.

FUMARIACEÆ.

Fumaria officinalis, Linn.

Fumaria officinalis, Linn., Sp. Pl., ed. 1, p. 790; Gray, Manual, ed. 5, p. 62.

BERMUDAS.—Introduced. Waste places—*Lane; Jones; Rein.*

An annual weed of cultivation that has spread from Europe.

Fumaria capreolata, Linn.

Fumaria capreolata, Linn., Sp. Pl., ed. 1, p. 701 var. *muralis*, Sonder in Koch, Fl. Germ., ed. 2, p. 1017 (species).

BERMUDAS.—Introduced. Without locality or remark—*Moseley; Reade.*

This also is of European origin.

CRUCIFERÆ.

Matthiola incana, R. Br.

Matthiola incana, R. Br. in Ait. Hort. Kew, ed. 2, iv. p. 119; DC., Prodr., i. p. 132.

BERMUDAS.—Introduced. Wild among the rocks on the sea-shore—*Jones; Lefroy; Moseley; Reade.*

It is noteworthy that this South European stock has established itself on the islands.

Nasturtium officinale, R. Br.

Nasturtium officinale, R. Br. in Ait. Hort. Kew, ed. 2, iv. p. 110; Chapm., Fl. Southern U.S., p. 25; Griseb., Fl. Brit. W. Ind., p. 13.

BERMUDAS.—Introduced. Pembroke Marsh—*Lefroy.*

Perennial. The watercress is a native of Europe, Western Asia, and North Africa, now naturalised in many other countries. In New Zealand, where also it is a colonist, it attains, or formerly attained, such enormous dimensions as to choke the rivers.

Alyssum maritimum, Lam.

Alyssum maritimum, Lam., Dict., i. p. 98; Gray, Manual, ed. 5, p. 72.

BERMUDAS.—Introduced. Waste places, common—*Moseley; Reade.*

Annual or perennial. A native of the South of Europe and Western Asia.

Sisymbrium officinale, Scop.

Sisymbrium officinale, Scop., Fl. Car., ii. p. 26; Chapm., Fl. Southern U.S., p. 28; Griseb., Fl. Brit. W. Ind., p. 13.

BERMUDAS.—Introduced. Roadsides—*Lefroy; Moseley; Reade.*

Annual or perennial. Native of Europe, Western Asia, and North Africa. It is also colonised in the Southern States of North America.

Brassica sinapistrum, Boiss.

Brassica sinapistrum, Boiss., Voy. Bot. dans le midi de l'Espagne, ii. p. 39; Gray, Manual, ed. 5, p. 70. *Sinapis arvensis*, Linn., Sp. Pl., ed. 1, p. 668.

BERMUDAS.—Introduced. Roadsides and waste places—*Lefroy.*

Annual. A very common weed of cultivation in Europe, Temperate Asia, and North Africa, and introduced in many other countries.

Capsella bursa-pastoris, Mœnch.

Capsella bursa-pastoris, Mœnch., Meth. Pl., p. 271; Griseb., Fl. Brit. W. Ind., p. 14; Chapm., Fl. Southern U.S., p. 30.

BERMUDAS.—Introduced. In cultivated and waste ground—*Lane; Rein; Lefroy.*

Annual. One of the commonest weeds of cultivation in temperate and sub-tropical regions throughout the world.

Senebiera pinnatifida, DC.

Senebiera pinnatifida, DC., Prodr., i. p. 203; Griseb., Fl. Brit. W. Ind., p. 14; Chapm., Fl. Southern U.S., p. 30.

BERMUDAS.—Introduced. Without indication of locality—*Rein.*

A common herb in the warm temperate regions of America, and naturalised in other countries.

Lepidium virginicum, Linn.

Lepidium virginicum, Linn., Sp. Pl., p. 645; Griseb., Fl. Brit. W. Ind., p. 14; Chapm., Fl. Southern U.S., p. 30.

BERMUDAS.—Introduced. Common in waste ground—*Jones; Lefroy.*

A North American annual, now naturalised in many countries. "Pepper-grass" of the islanders.

Lepidium ruderale, Linn.

Lepidium ruderale, Linn., Sp. Pl., ed. 1, p. 645; Gray, Manual, ed. 5, p. 74.

BERMUDAS.—Introduced. Roadsides, scarce—*Lane;* common—*Reade.*

Annual. Europe and Asia, and introduced in many other countries.

Cakile æqualis, L'Herit.

Cakile æqualis, L'Herit., in DC. Prodr., i. p. 185; Deless. Ic. Sel., ii. t. 57; Griseb., Fl. Brit. W. Ind., p. 14.

Cakile maritima, Scop., var. *æqualis*, Chapm., Fl. Southern U.S., p. 31.

BERMUDAS.—Indigenous. Common on the shores of the islands—*Lefroy; Moseley.*

A maritime herb inhabiting the West Indies from Cuba to St Vincent and the Bahamas, and the Southern States of North America.

The European *Cakile maritima* is perhaps not specifically different. This is the scurvy-grass of the islanders, and most likely the plant named *Cochlearia officinalis* in Jones's list.

Raphanus raphanistrum, Linn.

Raphanus raphanistrum, Linn., Sp. Pl., ed. 1, p. 669; Gray, Manual, ed. 5, p. 75.

BERMUDAS.—Introduced. Without any note—*Moseley; Reade.*

A weed of Europe, naturalised in many countries.

CARYOPHYLLACEÆ.

Cerastium vulgatum, Linn.

Cerastium vulgatum, Linn., Sp. Pl., ed. 2, p. 627; Chapm., Fl. Southern U.S., p. 50; Gray, Manual, ed. 5, p. 93.

BERMUDAS.—Introduced. Cultivated ground—*Moseley; Reade.*

A very common annual weed of cultivation in temperate and sub-tropical climates.

Cerastium viscosum, Linn.

Cerastium viscosum, Linn., Sp. Pl., ed. 1, p. 437; Griseb., Fl. Brit. W. Ind., p. 55; Chapm., Fl. Southern U.S., p. 50.

BERMUDAS.—Introduced. Without locality—*Lane.*

Also a very widely-dispersed annual weed.

Stellaria media, Cyr.

Stellaria media, Cyr., Char. Comm., p. 36; Griseb., Fl. Brit. W. Ind., p. 55; Chapm., Fl. Southern U.S., p. 50.

BERMUDAS.—Introduced. Cultivated ground—*Lane; Rein; Moseley.*

A very widely-dispersed annual in temperate regions.

Arenaria serpyllifolia, Linn.

Arenaria serpyllifolia, Linn., Sp. Pl., ed. 1, p. 463; Chapm., Fl. Southern U.S., p. 49.

BERMUDAS.—Introduced. A common weed—*Lefroy; Reade.*

Widely dispersed in the Old World, and introduced in North America.

Arenaria alsinoides, Willd.

Arenaria alsinoides, Willd., in Mag. Gesellsch. Naturf. Freunde Berl., vii. p. 196, et Sp. Pl., vi. p. 35.
Arenaria nemorosa, H. B. K., Nov. Gen. et Sp., vi. p. 35.
Arenaria diffusa, Elliot, Bot. S. Carol., i. p. 519; Chapm., Fl. Southern U.S., p. 49; Griseb., Fl. Brit. W. Ind., p. 55.
Stellaria lanuginosa, Torr. and Gray, Fl. N. Am., i. p. 167.

BERMUDAS.—Indigenous. Paynter's Vale—*Lefroy*; without locality—*Moseley*.

A common American plant, ranging from North Carolina through the West Indies and Mexico to Peru and Bolivia.

PORTULACEÆ.

Montia fontana, Linn.

Montia fontana, Linn., Sp. Pl., ed. 1, p. 87; Hemsl. in Godm. and Salv., Biolog. Centr.-Am., i. p. 31.

BERMUDAS.—Indigenous? Without locality—*Lefroy*.

A marsh plant having an exceedingly wide range, both in the Old World and in America, though strange to say it appears to be absent from the Eastern States of North America and the West Indies. It is a common element in remote islets where the necessary moisture exists.

Portulaca oleracea, Linn.

Portulaca oleracea, Linn., Sp. Pl., ed. 1, p. 445; Chapm., Fl. Southern U.S., p. 44; Griseb., Fl. Brit. W. Ind., p. 57.

BERMUDAS.—Introduced. A common weed in cultivated ground—*Jones*.

In all tropical and most sub-tropical regions. We have seen no Bermudan specimens of this plant, but we have no reason for doubting its presence in the islands. See the observations on its distribution in the following account of the plants found in the Island of Ascension.

TAMARISCINEÆ.

Tamarix gallica, Linn.

Tamarix gallica, Linn., Sp. Pl., ed. 1, p. 270; DC., Prodr., iii. p. 96.

Common on the north shore near the Flatts—*Jones*; common—*Moseley*; *Lefroy*; *Reade*.

This Old World seaside shrub has thoroughly established itself in the Bermudas, where it is called "Spruce."

HYPERICINEÆ.

Ascyrum hypericoides, Linn.

Ascyrum hypericoides, Linn., Sp. Pl., ed. 1, p. 788; Griseb., Fl. Brit. W. Ind., p. 112.

BERMUDAS.—Introduced. Marshes—*Lane; Jones; Rein; Lefroy; Moseley; Reade.*

West Indies and Mexico to New Granada.

The "Hypericum" (?) of Jones's list is doubtless this plant.

Ascyrum crux-andreæ, Linn. of the Eastern States of N. America is very closely allied.

GUTTIFERÆ.

Calophyllum calaba, Jacq.

Calophyllum calaba, Jacq., Sel. Stirp. Amer., p. 269, t. 165; Griseb., Fl. Brit. W. Ind., p. 108.

BERMUDAS.—Introduced. Common in hedges—*Lefroy;* fine examples of this tree on the roadside in Devonshire parish—*Jones.*

Introduced from the West Indies, where, as well as in South America, it has a wide range.

MALVACEÆ.

Malva parviflora, Linn.

Malva parviflora, Linn., Amœn. Acad., iii. p. 416; DC., Prodr., i. p. 433.

BERMUDAS.—Introduced. Without memorandum—*Moseley; Reade.*

A domestic weed from the Old World, apparently not naturalised in the United States, though several other closely allied species are.

Sida glomerata, Cav.

Sida glomerata, Cav., Diss., t. 2, fig. 6; Griseb., Fl. Brit. W. Ind., p. 73.

BERMUDAS.—Introduced. Without locality or memorandum—*Moseley.*

Half-shrub. Common in the West Indies, Mexico, and the northern part of South America.

Sida carpinifolia, Linn.

Sida carpinifolia, Linn., fil., Sp. Pl. Suppl., p. 307; Griseb., Fl. Brit. W. Ind., p. 73.

BERMUDAS.—Indigenous? Very common all over the islands—*Lane; Jones; Lefroy.*

A half-shrubby plant, almost universally spread in Tropical America, Africa, and Asia.

This is the "Wire-weed" of the islanders, and probably reached the islands independently of human agency.

Modiola multifida, Mœnch.

Modiola multifida, Mœnch., Meth. Pl., p. 969; Chapm., Fl. Southern U.S., p. 56.
Malva caroliniana, Linn., Sp. Pl., ed. 1, p. 688.
Modiola caroliniana, G. Don.; Griseb., Fl. Brit. W. Ind., p. 72.

Bermudas.—Indigenous? Under walls, &c.—*Lane*; without locality—*Moseley*; *Reade*.

A half-shrub, inhabiting America from Carolina southward to Chili and Buenos Ayres.

Pavonia spinifex, Cav.

Pavonia spinifex, Cav., Diss., t. 45, figs. 2, 3; Griseb., Fl. Brit. W. Ind., p. 82; Chapm., Fl. Southern U.S., Suppl., p. 608.

Bermudas.—Introduced. Only in Southampton parish—*Lefroy*.

A shrub generally dispersed in the West Indies and South America.

Kosteletzkya virginica, Presl.

Kosteletzkya virginica, Presl., ex A. Gray, Gen. Fl. Am. Bor. Ill., ii. p. 80, t. 132; Chapm., Fl. Southern U.S., p. 57.
Hibiscus virginicus, Linn., Sp. Pl., ed. 1, p. 697.

Bermudas.—Indigenous. Pembroke Marsh—*Lefroy*.

North America, from New York to Florida. This is a marsh herbaceous plant, and was probably introduced into the islands by birds.

Hibiscus tiliaceus, Linn.

Hibiscus tiliaceus, Linn., Sp. Pl., ed. 1, p. 694; Chapm., Fl. Southern U.S., p. 58; Desc., Fl. Ant., ii. t. 148.
Paritium tiliaceum, St Hil., Fl. Bras. Mer., i. p. 256; Griseb., Fl. Brit. W. Ind., p. 86.

Bermudas.—Indigenous? Walsingham—*Lane*; without exact locality—*Moseley*.

A common tree on tropical and sub-tropical sea-shores nearly all over the world.

Hibiscus elatus, Swartz.

Hibiscus elatus, Swartz, Fl. Ind. Occ., ii. p. 1218; Griseb., Fl. Brit. W. Ind., p. 86.

Bermudas.—Introduced. Probably nowhere wild in the islands; but it was raised from seed washed ashore many years ago—*Lefroy*.

West Indies. Had this sprung up from seed unaided, it would belong to our category of indigenous.

Thespesia populnea, Solander.

Thespesia populnea, Solander, ex Correa in Ann. Mus. Hist. Nat. Par., ix. p. 290, t. 8, fig. 1; Griseb., Fl. Brit. W. Ind., p. 87.

Bermudas.—Introduced. St George—*Lefroy*; without locality—*Jones*.

A common tree on the sea-coasts of Tropical Asia, Africa, Pacific Islands, and North Australia. It is also common in some of the West Indian Islands, though Mr Bentham (*Flora Australiensis*, i. p. 221) states that it was introduced.

STERCULIACEÆ.

Melochia odorata, Linn.

Melochia odorata, Linn., fil., Sp. Pl. Suppl., p. 302; Griseb., Fl. Brit. W. Ind., p. 94.

BERMUDAS.—Introduced. Pembroke Marsh—*Lefroy*.

A common Pacific island tree, introduced into the West Indies, according to Grisebach. How it reached the Bermudas we are uninformed. We have not seen Lefroy's specimen, but we learn from his memoranda that it was named by Dr Asa Gray.

TILIACEÆ.

Triumfetta lappula, Linn.

Triumfetta lappula, Linn., Sp. Pl., ed. 1, p. 444; Griseb., Fl. Brit. W. Ind., p. 95.
Lappula bermudensis, Pluk., Alm., p. 206, et Phylogr., t. 245, fig. 7.

BERMUDAS.—Introduced? or perhaps indigenous. Without exact localities—*Lefroy; Moseley*. Also in the British Museum, in Sloane's Herbarium, xcvi. p. 128.

A common weed in the West Indies and Tropical America.

Triumfetta althæoides, Lam.

Triumfetta althæoides, Lam., Encycl., iii. p. 420; Griseb., Fl. Brit. W. Ind., p. 96.

BERMUDAS.—Introduced? Without locality—*Rein*. Grisebach also records it from the Bermudas, but we have seen no specimen.

West Indies and South America.

Triumfetta semitriloba, Jacq.

Triumfetta semitriloba, Jacq., Sel. Stirp. Amer., p. 147; Linn., Mant., p. 73; Griseb., Fl. Brit. W. Ind., p. 96.

BERMUDAS.—Indigenous? Walsingham—*Lane; Lefroy*.

Nearly all tropical countries, except perhaps Australia.

This is the "Box-bush" of the islanders.

Waltheria americana, Linn.

Waltheria americana, Linn., Sp. Pl., ed. 1, p. 637; Griseb., Fl. Brit. W. Ind., p. 95.

BERMUDAS.—Indigenous. Pembroke Marsh—*Lefroy*.

In tropical and sub-tropical regions all round the globe, though not hitherto found in south-eastern North America.

GERANIACEÆ.

Geranium carolinianum, Linn.

Geranium carolinianum, Linn., Sp. Pl., ed. 1, p. 682 ; Chapm., Fl. Southern U.S., p. 65.

BERMUDAS.—Introduced. Without localities—*Lefroy ; Rein ; Moseley ; Reade.*

This species is common in the United States and Mexico, and is hardly distinct from the widely-diffused *Geranium dissectum*, Linn. Some of the Bermudan specimens bear the latter name.

Geranium pusillum, Linn.

Geranium pusillum, Linn., Sp. Pl., ed. 2, p. 957 ; Gray, Manual, ed. 5, p. 107.

BERMUDAS.—Introduced. Roadsides—*Lane.*

Europe, North Africa, and Western Asia. Introduced into North America.

Oxalis corniculata, Linn.

Oxalis corniculata, Linn., Sp. Pl., ed. 1, p. 435 ; Griseb., Fl. Brit. W. Ind., p. 133.

BERMUDAS.—Introduced ? Common—*Lefroy ; Moseley ; Reade.*

An almost ubiquitous plant, excepting in the colder regions ; occurring in the most remote islets as well as continental countries. There are several forms.

Oxalis cernua, Thunb.

Oxalis cernua, Thunb., Diss. Ox., n. 12, t. 2, fig. 2 ; DC., Prodr., i. p. 696.

BERMUDAS.—Introduced. Without locality—*Rein.*

A South African species ; now naturalised in many countries.

[*Oxalis acetosella*, Linn., is recorded by Michaux (Ann. Mus. Hist. Nat. Par., viii. p. 358) as being common in the islands ; but that is such an unlikely plant to be found, that the name must have been a slip of the pen, probably for *Oxalis corniculata*.]

LINACEÆ.

Linum usitatissimum, Linn.

Linum usitatissimum, Linn., Sp. Pl., ed. 1, p. 277 ; Gray, Manual, ed. 5, p. 105.

BERMUDAS.—Introduced. Amongst rubbish—*Lane.*

Introduced from Europe, and apparently only casual, as it is not included in recent lists.

AURANTIACEÆ.

Several of the orange family were cultivated by the earliest colonists, and soon spread over the islands in a wild state. Rein includes *Citrus aurantium*, Linn., the sweet orange, and *Citrus medica*, Linn., the citron, in his list. Jones states that *Citrus limetta*, Riss., the lime, grows wild all over the islands. Concerning *Citrus limonum*, Riss., the same authority says: "The common lemon grows wild everywhere, not in such abundance as before the disease of 1854–55, which attacked the lemon as well as the orange. Thousands of fine trees before that date existed throughout the cedar groves, and the fruit was so abundant that it only ripened to fall and rot upon the ground.

SIMARUBEÆ.

Suriana maritima, Linn.

Suriana maritima, Linn., Sp. Pl., ed. 1, p. 284; Griseb., Fl. Brit. W. Ind., p. 58; Lam., Ill. Pl., t. 389; Chapm., Fl. Southern U.S., p. 149.

BERMUDAS.—Indigenous. South shores, Hungry Bay, &c.—*Rein; Lefroy; Moseley; Reade.*

Very widely spread on the sea-coasts of warm countries, including Florida and the West Indies.

MELIACEÆ.

Melia azedarach, Linn.

Melia azedarach, Linn., Sp. Pl., ed. 1, p. 384; Chapm., Fl. Southern U.S., p. 62.

BERMUDAS.—Introduced.

The "Pride of India" was introduced into the islands, according to the Hon. J. H. Darrell, from Charleston. In a note to Sir J. Henry Lefroy he says, "I have heard my father say it was brought from Charleston within his recollection—that is, after the peace of 1782."

Swietenia mahagoni, Jacq.

Swietenia mahagoni, Jacq., Sel. Stirp. Amer., p. 127; Chapm., Fl. Southern U.S., p. 62.

BERMUDAS.—Introduced. The Flatts—*Lefroy.*

Florida, West Indies, and Central America.

"Introduced from the Barbadoes some thirty-five or forty years ago."—*Darrell.*

ILICINEÆ.

Ilex cassine, Linn.

Ilex cassine, Linn., Sp. Pl., ed. 1, p. 125; Chapm., Fl. Southern U.S., p. 269.
Ilex vomitoria, Ait. Hort. Kew, ed. 1, i. p. 170.

BERMUDAS.—Introduced. The Flatts—*Lefroy.*

North America. A coast shrub, ranging from Virginia to Florida.

This is said to have been introduced by Paynter, the grandfather of Captain W. Peniston, in the last century.—*Lefroy.*

CELASTRINEÆ.

Elæodendron xylocarpum, DC.

Elæodendron xylocarpum, DC., Prodr., ii. p. 11; Griseb., Fl. Brit. W. Ind., p. 145.
Elæodendron rotundatum, DC., loc. cit.
Cassine xylocarpa, Vent., Choix, t. 23.

Specimina bermudiana ab iis Indiæ occidentalis differunt foliis angustioribus, deorsum attenuatis, dentibus distincte apiculatis instructis; floribus etiam paullo majoribus—fructus deest.

BERMUDAS.—Indigenous. Walsingham—*Lane;* without localities—*Rein; Moseley; Lefroy.*

West Indies.

The Bermudan plant should perhaps rank as a distinct species, but the specimens are insufficient to settle this point.

AMPELIDEÆ.

Ampelopsis quinquefolia, Michx.

Ampelopsis quinquefolia, Michx., Fl. Bor.-Am., i. p. 160; Chapm., Fl. Southern U.S., p. 72.

BERMUDAS.—Indigenous? Wild at Walsingham—*Lefroy.*

The Virginian creeper extends from Canada to Florida. How it reached the Bermudas we do not know.

SAPINDACEÆ.

Cardiospermum microcarpum, H. B. K.

Cardiospermum microcarpum, H. B. K., Nov. Gen. et Sp., v. p. 104; Griseb., Fl. Brit. W. Ind., p. 122.

BERMUDAS.—Indigenous. Without locality—*Rein.*

A very widely diffused plant in warm countries, including Florida and the West Indies.

Cardiospermum halicacabum, Linn.

Cardiospermum halicacabum, Linn., Sp. Pl., ed. 1, p. 366; Griseb., Fl. Brit. W. Ind., p. 122; Chapm., Fl. Southern U.S., p. 79.

BERMUDAS.—Indigenous. Devonshire Marsh—*Munro;* common in some places—*Lefroy.*

In nearly all warm countries, including Florida and the West Indies.

Sapindus saponaria, Linn.

Sapindus saponaria, Linn., Sp. Pl., ed. 1, p. 367; Griseb., Fl. Brit. W. Ind., p. 126; Chapm., Fl. Southern U.S., Suppl., p. 613.

BERMUDAS.—Indigenous.

The first tree known in the Bermudas sprang up from drift seed. It is rare. In 1841 a plant sprang up from a heap of sea-weed collected during the previous autumn for manure.—*Jones.*

Florida; West Indies; Venezuela.

Dodonæa viscosa, Linn., var. *angustifolia.*

Dodonæa viscosa, Linn., Mant., p. 228, var. *angustifolia*, Linn., fil., Sp. Pl. Suppl., p. 218; Griseb., Fl. Brit. W. Ind., p. 128 (species).

BERMUDAS.—Indigenous. South Road to Ferry—*Lane;* Harrington Sound, &c.—*Lefroy;* in the bays—*Rein;* without locality—*Jones; Moseley.*

In almost all warm countries, especially on the sea-coast, and in dry, barren places. All the specimens we have seen from the Bermudas belong to the narrow-leaved form. It is the "Dogwood" and "Broom" of the islanders.

[In Mr Reade's collection we saw a specimen of the North American *Acer negundo*, Linn. (*Negundo aceroides*, Mœnch.), labelled "Near Spanish Point," but without any further note.]

ANACARDIACEÆ.

Rhus toxicodendron, Linn.

Rhus toxicodrendron, Linn., Sp. Pl., ed. 1, p. 266; Chapm., Fl. Southern U.S., p. 69.
Rhus radicans, Linn., loc. cit.
Rhus diversiloba, Torr. and Gr., Fl. N. Am., i. p. 219.

BERMUDAS.—Indigenous. Without locality—*Lane;* abundant in marshes—*Moseley;* climbing up trees 30 feet—*Lefroy;* common in thickets, mouths of caverns, &c., especially on some of the islands of the Great Sound—*Jones;* without special locality—*Rein;* Boaz Island—*Reade.*

North America, from Canada to Mexico, and on both sides of the continent, if *Rhus*

diversiloba be merely a form of the same species. The foliage is very variable in size and shape.

"The 'poison ivy' is very much dreaded by the natives."—*Lefroy.* "It is strange that this plant should prove so poisonous to some persons, that even a close approach to it is sufficient to cause a severe attack of inflammation of the face, whilst others may handle it, or even rub the leaves on their faces, with impunity."—*Jones.* In the following passage from the Historye of the Bermudaes (p. 2) we have evidence of the existence of this shrub in the islands when they were first settled. . . . "As likewise the poysonous weed, being in shape but little different from our English yuie [ivy]; but being touched causeth rednesse, itchinge, and lastly blysters, the which, howsoever, after a while they passe awaye of themselves without further harme; yet because for the time they are somewhat painefull, and in aspect dangerous, it hath gotten to itselfe an ill name, although questionlesse of noe very ill nature."

LEGUMINOSÆ.

PAPILIONACEÆ.

Medicago lupulina, Linn.

Medicago lupulina, Linn., Sp. Pl., ed. 1, p. 779; Chapm., Fl. Southern U.S., p. 90; Michx. in Ann. Mus. Hist. Nat., Par., viii. p. 359.

BERMUDAS.—Introduced. The commonest plant in the islands, growing everywhere, and forming nearly the whole of the verdure—*Michaux,* 1806; common throughout the islands, especially on pasture lands, and thriving in the shallowest soil—*Jones;* without special locality—*Moseley; Lefroy.*

An annual, native of Europe, &c., and naturalised in many countries.

Medicago denticulata, Willd.

Medicago denticulata, Willd., Sp. Pl., iii. p. 1414; Gray, Manual, ed. 5, p. 128.

BERMUDAS.—Introduced. Without locality—*Moseley; Lefroy.*

An annual, native of Europe, North Africa, and Western Asia.

Medicago maculata, Willd., and *Medicago muricata,* All., have also been collected in the islands by Sir J. H. Lefroy. They are both annuals or biennials of European origin.

Melilotus officinalis, Willd.

Melilotus officinalis, Willd., Enum. Pl. Hort. Bot. Berol., p. 790; Chapm., Fl. Southern U.S., p. 90.

BERMUDAS.—Introduced. Common in many places—*Jones.*

Europe and Asia. Introduced in America.

Melilotus parviflora, Desf.

Melilotus parviflora, Desf., Fl. Atl., ii. p. 192; DC., Prodr., ii. p. 187.

BERMUDAS.—Introduced. Without locality—*Moseley*. Also in the British Museum, in Sloane's Herbarium, vol. xxxii. p. 83, collected by *Dickinson*.

An annual or biennial weed of cultivation from Europe.

Vicia sativa, Linn.

Vicia sativa, Linn., Sp. Pl., ed. 1, p. 736; Chapm., Fl. Southern U.S., p. 98; Gray, Manual, ed. 5, p. 138.

BERMUDAS.—Introduced. Common in pasture land—*Jones*.

A native of Europe and other parts of the Old World, and probably a relic of cultivation in these islands.

Centrosema virginianum, Benth.

Centrosema virginianum, Benth. in Mart. Fl. Bras., xv. 1, p. 132; Chapm., Fl. Southern U.S., p. 107.

BERMUDAS.—Indigenous? Without locality—*Rein*.

America, ranging from Maryland to South Brazil.

Erythrina corallodendrum, Linn.

Erythrina corallodendrum, Linn., Sp. Pl., ed. 1, p. 706; Griseb., Fl. Brit. W. Ind., p. 199; Desc., Fl. Ant., iv. t. 298.

Erythrina speciosa, Andr., Bot. Repos., t. 443.

BERMUDAS.—Introduced. Introduced into the Bermudas from St Thomas about fifty years ago—*Darrell*.

West Indies to Brazil.

Canavalia obtusifolia, DC.

Canavalia obtusifolia, DC., Prodr., ii. p. 404; Griseb., Fl. Brit. W. Ind., p. 197; Desc., Fl. Ant., viii. t. 559; Chapm., Fl. Southern U.S., p. 109.

Canavalia rosea et *Canavalia miniata*, DC., loc. cit.

BERMUDAS.—Indigenous. Common on the sea-coast—*Jones; Moseley; Lefroy*.

This is a very common sea-shore plant in nearly all warm countries, including many remote islands. It appears to be one of those *Leguminosæ* whose seeds germinate after long immersion in sea-water. It bears the local name of "Bay-bean."

Vigna luteola, Benth.

Vigna luteola, Benth. in Mart. Fl. Bras., xv. 1, p. 194, t. 50, fig. 2; Griseb., Fl. Brit. W. Ind., p. 195.

Vigna glabra, Savi; Chapm., Fl. Southern U.S., p. 106.

BERMUDAS.—Indigenous? Without locality—*Lefroy*.

A common American plant in brackish marshes on the sea-shores, from Carolina to Buenos Ayres and Chili; also in Africa, Australia, &c.

Cajanus indicus, Spreng.

Cajanus indicus, Spreng., Syst. Veg., iii. p. 248; Griseb., Fl. Brit. W. Ind., p. 191.

Bermudas.—Introduced. Common on David Island—*Jones*; *Lefroy*.

Believed to be a native of the Old World; but it is now wild in most warm countries, having spread from cultivation.

Sophora tomentosa, Linn.

Sophora tomentosa, Linn., Sp. Pl., ed. 1, p. 373; Griseb., Fl. Brit. W. Ind., p. 203; Chapm., Fl. Southern U.S., p. 113; Desc., Fl. Ant., vii. t. 475.

Bermudas.—Indigenous. Without locality—*Lefroy's list*; Boaz Island—*Reade*.

There is also a specimen in the Herbarium of the British Museum labelled "Bermuda," but without the collector's name.

This tree occurs on nearly all tropical sea-shores, and extends beyond the tropics in some parts of the world.

Cæsalpiniæ.

Cæsalpinia bonducella, Fleming.

Cæsalpinia bonducella, Fleming in Asiat. Res., xi. p. 159.
Guilandina bonducella, Linn., Sp. Pl., ed. 2, p. 545; Griseb., Fl. Brit. W. Ind., p. 204; Desc., Fl. Ant., ii. t. 90.

Bermudas.—Introduced? Walsingham—*Lefroy*.

A cosmopolitan shrub in warm climates, flourishing equally well on the sea-shore and inland, ascending to an altitude of 2500 feet in the Himalayas.

Cassia occidentalis, Linn.

Cassia occidentalis, Linn., Sp. Pl., ed. 1, p. 377; Griseb., Fl. Brit. W. Ind., p. 209; Chapm., Fl. Southern U.S., p. 114; Desc., Fl. Ant., ii. t. 135.

Bermudas—Introduced. Common—*Lefroy*.

An annual species, generally diffused in warm countries, except Australasia.

Cassia bicapsularis, Linn.

Cassia bicapsularis, Linn., Sp. Pl., ed. 1, p. 376; Griseb., Fl. Brit. W. Ind., 207; Jacq., Fragm., t. 58.

Bermudas.—Introduced. Without localities—*Moseley*; *Lefroy*.

A shrubby species, having a very wide range in the warmer parts of America and the West Indian islands.

Bauhinia, sp.

BERMUDAS.—Introduced. A tree at the model farm—*Lefroy*.

There is also a flowerless specimen in the British Museum from the Banksian Herbarium, labelled "Bermuda," but without the collector's name.

MIMOSEÆ.

Desmanthus virgatus, Willd.

Desmanthus virgatus, Willd., Sp. Pl., iv. p. 1047; Chapm., Fl. Southern U.S., p. 116; Griseb., Fl. Brit. W. Ind., p. 218.

BERMUDAS.—Indigenous? Not uncommon—*Lefroy*.

Tropical and Sub-tropical America, from Florida and Lower California to Buenos Ayres. Introduced in India.

Leucæna glauca, Benth.

Leucæna glauca, Benth., in Hook. Journ. Bot., iv. p. 416; Trans. Linn. Soc. Lond., xxx. p. 443; Griseb., Fl. Brit. W. Ind., p. 220; Chapm., Fl. Southern U.S., Suppl., p. 619.

BERMUDAS.—Indigenous? Exceedingly common—*Rein*; *Moseley*; *Lefroy*.

Generally dispersed in warm countries, though most likely of Tropical American origin.

Acacia paniculata, Willd.

Acacia paniculata, Willd., Sp. Pl., iv. p. 1074; Griseb., Fl. Brit. W. Ind., p. 221.

BERMUDAS.—Introduced? Very common—*Jones*.

This is a common Tropical American shrub; but we have seen no Bermudan specimens, and it is probable that Mr Jones may have mistaken *Leucæna glauca* for it.

CRASSULACEÆ.

Bryophyllum calycinum, Salisb.

Bryophyllum calycinum, Salisb., Parad. Lond., t. 3; Bot. Mag., t. 1409; Griseb., Fl. Brit. W. Ind., p. 303.

BERMUDAS.—Introduced. An abundant weed—*Lane*; *Rein*; *Lefroy*.

A native of Tropical Africa, now common in most warm countries. According to Rein, it was introduced into the Bermudas by a Captain Stowe in 1813.

RHIZOPHOREÆ.

Rhizophora mangle, Linn.

Rhizophora mangle, Linn., Sp. Pl., ed. 1, p. 443; Griseb., Fl. Brit. W. Ind., p. 274; Chapm., Fl. Southern U.S., p. 135; Desc., Fl. Ant., i. t. 10.

BERMUDAS.—Indigenous. Forming thickets in the bays—*Lane; Rein; Moseley; Lefroy;* perhaps the most extensive mangrove swamp is at Hungry Bay, Devonshire Parish—*Jones.*

Florida, West Indies, and coast of Tropical America generally; also West Tropical Africa.

COMBRETACEÆ.

Conocarpus erectus, Jacq.

Conocarpus erectus, Jacq., Sel. Stirp. Am., p. 78, t. 52; Griseb., Fl. Brit. W. Ind., p. 277; Chapm., Fl. Southern U.S., p. 136.

Alnus maritimum, Coriarorum, Buttonwood, Bermudensibus vulgo, Pluk., Alm., p. 18, et Phytogr., t. 240, fig. 3.

BERMUDAS.—Indigenous. General on the sea-shore.—*Lane; Jones; Rein; Moseley; Lefroy; Reade.* Also in the British Museum, Sloane Herbarium, xcv. p. 29.

Florida to Brazil, and on the western coast of America, as well as of Tropical Africa.

This is the "Buttonwood" of the islanders, the "Wild Mulberry" of the early settlers, inadvertently named *Conocarpus racemosus* (*Laguncularia racemosa*) in Lefroy's Memorials of Bermuda, and in the Historye of the Bermudaes. This is also a common maritime shrub; but it has not hitherto, so far as we are aware, been found in the Bermudas.

MYRTACEÆ.

Eugenia monticola, DC.

Eugenia monticola, DC., Prodr., iii. p. 275; Griseb., Fl. Brit. W. Ind., p. 236; Chapm., Fl. Southern U.S., p. 131.

BERMUDAS.—Indigenous. Common about Walsingham—*Lefroy;* Boaz Island—*Reade.*

Florida and the West Indies.

We are not quite satisfied that all the specimens in the Kew Herbarium referred to this are really one and the same species. The Bermudan flowering specimen quite agrees with the Floridan, whilst the fruit is larger, though not larger than that of Cuban specimens named *Eugenia monticola* by Grisebach. This shrub bears the local name of "Stopper."

Psidium pomiferum et Psidium pyriferum, Linn.

Psidium pomiferum et *Psidium pyriferum*, Linn., Sp. Pl., ed. 2, p. 672.
Psidium guava, Radd. ex Griseb. Fl. Brit. W. Ind., p. 241.

BERMUDAS.—Introduced. Marsh near Devonshire—*Lane.*

The Guava, a native of Tropical America, is naturalised in all warm countries.

From a letter to Sir J. H. Lefroy, signed W. Cox, it would appear that for many years past nobody has troubled to cultivate it in the Bermudas.

Punica granatum, Linn.

Punica granatum, Linn., Sp. Pl., ed. 1, p. 472; Griseb., Fl. Brit. W. Ind., p. 242.

BERMUDAS.—Introduced—*Lane; Lefroy.*

Mediterranean region, and eastward to North-Western India, where it is believed to be indigenous.

ONAGRARIEÆ.

Œnothera rosea, Ait.

Œnothera rosea, Ait., Hort. Kew, ed. 1, ii. p. 3; Bot. Mag., t. 347; Griseb., Fl. Brit. W. Ind., p. 273.

BERMUDAS.—Introduced. Without locality—*Moseley; Reade.*

Texas to New Grenada, and in the West Indies. Naturalised in many other countries.

Œnothera sinuata, Michx.

Œnothera sinuata, Michx., Fl. Bor.-Am., i. p. 224; Chapm., Fl. Southern U.S., p. 138.
Œnothera humifusa, Nutt., Gen. N. Am. Pl., i. p. 245.

BERMUDAS.—Introduced. Roadsides, &c.—*Rein; Lefroy; Reade.*

Southern States of North America and Mexico.

Gaura coccinea, Nutt.

Gaura coccinea, Nutt. in Torr. and Gray, Fl. N. Am., i. p. 73; Hemsl. in Godm. and Salv., Biol. Centr. Am., i. p. 466.

BERMUDAS.—Introduced. Without locality—*Rein.*

Widely dispersed in Western North America, including Mexico.

Ludwigia repens, Swartz.

Ludwigia repens, Swartz, Fl. Ind. Occ., i. p. 273; Ic. Pl. Ind. Occ., t. 8.
Isnardia repens, DC., Prodr., iii. p. 60; Griseb., Fl. Brit. W. Ind., p. 271.
Ludwigia natans, Ell.; Chapm., Fl. Southern U.S., p. 142, fide Griseb., Fl. Brit. W. Ind., p. 271.

BERMUDAS.—Indigenous. Abundant in peat marshes—*Moseley;* without locality—*Rein.*

South Carolina to Texas and the West Indies.

This species strongly resembles the widely-spread *Ludwigia palustris*, differing in its more robust habit and in having petals: possibly it is only a petaliferous state of that species.

PASSIFLOREÆ.

Passiflora ciliata, Ait.

Passiflora ciliata, Ait., Hort. Kew, ed. 1, iii. p. 310; Bot. Mag., t. 288; Griseb., Fl. Brit. W. Ind., p. 294.

Bermudas.—Introduced. Walsingham—*Lefroy; Reade.*

West Indies, from the Bahamas to Jamaica.

Masters (Mart. Fl. Bras., xiii. 1, p. 583) treats this as a variety of *Passiflora fœtida*, Linn., a widely diffused species, alike in America and the Old World.

CUCURBITACEÆ.

Sicyos angulatus, Linn.

Sicyos angulatus, Linn., Sp. Pl., ed. 1, p. 1013; Chapm., Fl. Southern U.S., p. 149.

Bermudas.—Introduced? Paynter's Vale, near Church Cave, &c.—*Moseley; Lefroy.*

Southern part of North America from Florida to California.

CACTACEÆ.

Opuntia pes-corvi, Leconte.

Opuntia pes-corvi, Leconte ex Engelm. in Proc. Am. Acad., iii. p. 346; Chapm., Fl. Southern U.S., p. 145; Rein in Bericht Senckenb. Naturf. Gesellsch. Frankf. am M. 1873, pp. 138 et 149.

Bermudas.—Indigenous. Without locality—*Rein.*

Florida.

Opuntia ficus-indica, Mill.

Opuntia ficus-indica, Mill, Dict., ed. 6, n. 2; Haw., Syn. Pl. Succ., p. 191; Chapm., Fl. Southern U.S., p. 144.

Bermudas.—Indigenous? Common—*Rein.*

South Florida, West Indies, and Tropical America.

This species has long been cultivated for its edible fruit, and it also occurs in a wild state, more or less, in the greater part of the area of its cultivation.

Opuntia tuna, Mill.

Opuntia tuna, Mill, Dict., ed. 6, n. 3; DC., Prodr., iii. p. 472; Griseb., Fl. Brit. W. Ind., p. 302; Desc., Fl. Ant., vii. t. 516; Jones in Proc. and Trans. Nov. Scot. Inst. Nat. Sc., Oct. 1873, p. 257.

BERMUDAS.—Indigenous? Common—*Jones*.

West Indies and Tropical America.

This species is also cultivated, and Engelmann (Synop. Cact. U.S. in Proc. Am. Acad., iii. reprint, p. 34) states that specimens gathered on the coast of South Carolina ("probably introduced") may belong to this species.

Opuntia vulgaris, Mill.

Opuntia vulgaris, Mill, Dict., ed. 6, n. 1; Chapm., Fl. Southern U.S., p. 144; Engelm., Synop. Cact. U.S. in Proc. Am. Acad., iii. reprint, p. 41.

BERMUDAS.—Indigenous? Without locality—*Lane*.

This species, according to Engelmann, ranges from the south-eastern coast of Massachusetts to Georgia and Florida.

As is set forth more fully in the introduction, one or more species of "prickly pear" were found in abundance by the first Englishmen who visited the islands; but we have seen no specimen of any species from the Bermudas, hence we can only give the names cited by the different writers. From their continental and West Indian distribution, there is no reason why all four of the species enumerated should not be wild in the Bermudas; yet as great confusion prevails in the names of *Cactaceæ*, it may be that there are only two, or at most three, species concerned. In his list, Rein includes only *Opuntia pes-corvi* and *Opuntia ficus-indica*, while in his description of the vegetation of the islands he mentions *Opuntia tuna*, in conjunction with the former, as one of the two species occurring in a wild state. Further, *Opuntia tuna* is included on the authority of Jones alone.

FICOIDEÆ.

Sesuvium portulacastrum, Linn.

Sesuvium portulacastrum, Linn., Sp. Pl., ed. 2, p. 684; Griseb., Fl. Brit. W. Ind., p. 57; Chapm., Fl. Southern U.S., p. 44.

BERMUDAS.—Indigenous. Common on the coast—*Lane; Jones; Moseley; Lefroy*.

Wisely diffused on tropical and sub-tropical sea-coasts.

UMBELLIFERÆ.

Hydrocotyle asiatica, Linn.

Hydrocotyle asiatica, Linn., Sp. Pl., ed. 1, p. 234; Griseb., Fl. Brit. W. Ind., p. 307.
Hydrocotyle repanda, Pers., Ench., i. p. 302; Chapm., Fl. Southern U.S., p. 159.
Hydrocotyle ficarioides, Michx., Fl. Bor.-Am., i. p. 161.

BERMUDAS.—Indigenous. Muddy places—*Moseley;* Devonshire marsh—*Lefroy;* without locality—*Rein;* marshes—*Reade.*

Very widely spread in the warm parts of Asia, Africa, America, and Australia.

Hydrocotyle umbellata, Linn.

Hydrocotyle umbellata, Linn., Sp. Pl., ed. 1, p. 234; Griseb., Fl. Brit. W. Ind., p. 307; Chapm., Fl. Southern U.S., p. 159; Rein in Bericht Senckenb. Naturf. Gesellsch. Frankf. am M., 1873, p. 150.

BERMUDAS.—Indigenous. Without locality—*Rein.*

Massachusetts southward through the West Indies and Mexico to Peru and Guiana.

We have seen no Bermudan specimens of this species; but it is so different from *Hydrocotyle asiatica* that we cannot suspect any error in the determination.

Smyrnium olusatrum, Linn.

Smyrnium olusatrum, Linn., Sp. Pl., ed. 1, p. 262; DC., Prodr., iv. p. 247.

BERMUDAS.—Introduced. Without memoranda—*Lane; Moseley.*

Europe, Northern Africa, and Western Asia; formerly commonly cultivated.

Apium leptophyllum, F. Muell.

Apium leptophyllum, F. Muell. in Benth. Fl. Austr., iii. p. 372.
Helosciadium leptophyllum, DC., Prodr., iv. p. 105; Griseb., Fl. Brit. W. Ind., p. 308; Chapm., Fl. Southern U.S., Suppl., p. 623.

BERMUDAS.—Introduced. Walls and roadsides—*Lane; Moseley; Lefroy.*

A very common annual weed all over the warmer parts of America; occurring also in Africa and Australia.

Apium graveolens, Linn.

Apium graveolens, Linn., Sp. Pl., ed. 1, p. 264; DC., Prodr., iv. p. 101.

BERMUDAS.—Introduced. Escaped from gardens—*Lane.* We have no other authority for the celery occurring wild.

Europe, Northern Africa, and Western Asia, and cultivated in other countries.

Ammi majus, Linn.

Ammi majus, Linn., Sp. Pl., ed. 1, p. 243; DC., Prodr., iv. p. 112; Sibthorp, Flora Græca, t. 273.

BERMUDAS.—Introduced. Waste places—*Moseley.*

A common weed of cultivation, especially in the Mediterranean region.

Fœniculum vulgare, Gærtn.

Fœniculum vulgare, Gærtn., Fruct., i. p. 105, t. 23, fig. 5; DC., Prodr., iv. p. 142.

BERMUDAS.—Introduced. The fennel is now very common throughout the islands—*Rein; Lane; Lefroy.*

Europe, Northern Africa, and Western Asia to Northern India.

Anethum graveolens, Linn.

Anethum graveolens, Linn., Sp. Pl., ed. 1, p. 263; DC., Prodr., iv. p. 186.

BERMUDAS.—Introduced. Abundant—*Lefroy.*

A native of Europe, &c. Dill is very commonly cultivated for its aromatic seeds, and is naturalised in many countries.

Coriandrum sativum, Linn.

Coriandrum sativum, Linn., Sp. Pl., ed. 1, p. 256; DC., Prodr., iv. p. 250.

BERMUDAS.—Introduced. Cultivated and wild—*Lefroy.*

The coriander is a native of the Old World, but it is now naturalised in many countries.

Caucalis nodosa, Huds.

Caucalis nodosa Huds., Fl. Angl., ed. nov. p. 114.
Torilis nodosa, Gærtn., Fruct., i. p. 82, t. 20, fig. 6; DC., Prodr., iv. p. 219.

BERMUDAS.—Introduced. Waste places—*Rein; Moseley; Reade.*

A native of Europe, Northern Africa, and Western Asia, and naturalised in many other countries.

GAMOPETALÆ.

RUBIACEÆ.

Rhachicallis rupestris, DC.

Rhachicallis rupestris, DC., Prodr., iv. p. 434; Griseb., Fl. Brit. W. Ind., p. 330.
Hedyotis rupestris, Swartz., Prodr. Fl. Ind. Occ., p. 29; H. B. K., Nov. Gen. et Sp. iii., p. 391.

BERMUDAS.—Indigenous. Common on rocks on the sea-shore—*Munro; Rein.*

Otherwise restricted to the West Indies, though ranging from the Bahamas to Cuba and Jamaica.

Randia aculeata, Linn.

Randia aculeata, Linn., Sp. Pl., ed. 1, p. 1192; Griseb., Fl. Brit. W. Ind., p. 318; Chapm., Fl. Southern U.S., p. 179.

BERMUDAS.—Indigenous. On hills in Warwick—*Lefroy;* in abundance on the ridge above the Paget Sand Hills—*Jones.*

Florida and the West Indies from Antigua to Cuba.

Locally known as "Wild Box" and "Inkberry."

Chiococca racemosa, Linn.

Chiococca racemosa, Linn., Syst. Nat., ii. p. 917; Jacq., Sel. Stirp. Am., p. 68; Griseb., Fl. Brit. W. Ind., p. 336; Chapm., Fl. Southern U.S., p. 177.

BERMUDAS.—Indigenous. Walsingham—*Lane;* abundant in places—*Lefroy; Moseley;* roadside near Tucker's Town—*Jones;* in the bays associated with *Dodonæa viscosa*, &c. —*Rein.*

Florida and Mexico southward to Peru and Brazil.

The "Blolly" of the islanders.

Coffea arabica, Linn.

Coffea arabica, Linn., Sp. Pl., ed. 1, p. 172; Griseb., Fl. Brit. W. Ind., p. 338.

BERMUDAS.—Introduced. Grows wild about Walsingham and different parts of the islands—*Jones;* confined to the Cave district—*Lefroy;* without locality—*Rein.*

Eastern Tropical Africa; also naturalised in the West Indies.

Morinda royoc, Linn.

Morinda royoc, Linn., Sp. Pl., ed. 1, p. 176; Griseb., Fl. Brit. W. Ind., p. 347; Chapm., Fl. Southern U.S., p. 177.

BERMUDAS.—Indigenous. Walsingham—*Lane;* without locality—*Lefroy.*

Florida, Cuba, Jamaica, Honduras, and Panama, usually growing in maritime districts.

Psychotria undata, Jacq.

Psychotria undata, Jacq., Hort. Schœnb., iii. p. 5, t. 260; Griseb., Fl. Brit. W. Ind., p. 342; Chapm. Fl. Southern U.S., p. 177.

BERMUDAS.—Indigenous. Walsingham—*Lefroy;* without locality—*Moseley.*

Florida, Bahamas, and Jamaica.

Spermacoce tenuior, Lam.

Spermacoce tenuior, Lam. ex Griseb. Fl. Brit. W. Ind., p. 349; Chapm., Fl. Southern U.S., p. 175.

BERMUDAS.—Introduced? Without localities or memoranda—*Lefroy; Reade.*

An annual herb, inhabiting Florida and Mexico and the country southward to Peru and Brazil.

Vaillantia hispida, Linn.

Vaillantia hispida, Linn., Sp. Pl., ed. 2, p. 1490; DC., Prodr., iv. p. 614.

BERMUDAS.—Introduced. Walls and roadsides—*Moseley; Rein.*

Introduced from Europe.

Lane's list includes "*Vaillantia muralis*," Linn., probably in error for this species.

Relbunium hypocarpium, Hemsl.

Relbunium hypocarpium, Hemsl. in Salv. and Godm. Biolog. Centr. Am. Bot., ii. p. 63.
Rubia hypocarpia, DC., Prodr., iv. p. 591.
Galium hypocarpium, Endl. ex Griseb. Fl. Brit. W. Ind., p. 351.

BERMUDAS.—Introduced? Without special locality—*Moseley; Lefroy.*

Generally dispersed in the West Indies and Tropical South America.

Galium uniflorum, Michx.

Galium uniflorum, Michx., Fl. Bor.-Am., i. p. 79; Chapm., Fl. Southern U.S., p. 174.

BERMUDAS.—Indigenous. In various localities—*Munro; Lefroy; Reade.*

South Carolina to Florida.

Galium bermudense, Linn.

Galium bermudense, Linn., Sp. Pl., ed. 1, p. 105.
Rubia tetraphylla, glabra, latiore folio, bermudensis, seminibus binis atropurpureis.—Pluk., Alm., p. 324, et Phytogr., t. 248. "A Do. Petiver habuimus."

It is uncertain what species Plukenet's plant is. Pursh (Fl. Am. Sept., i. p. 104) regards *Galium puncticulosum*, Michx. (Fl. Bor.-Am., i. p. 8), and *Galium purpureum*, Walt. (Fl. Carol., p. 87), as the same. Chapman (Fl. Southern U.S., p. 174) cites *Galium bermudianum*, Ell. (Bot. Carol., i. p. 196), under *Galium pilosum*, Ait.

VALERIANEÆ.

Centranthus macrosiphon, Boiss.

Centranthus macrosiphon, Boiss., Diag. Pl. Nov., iii. p. 57; Walp., Rep., vi. p. 80; Lem., Jard. Fleur., iii. t. 273.

BERMUDAS.—Introduced. Without locality—*Rein.*

A native of Western Europe, probably imported into the islands for its beauty.

Valerianella olitoria, Mœnch.

Valerianella olitoria, Mœnch., Meth. Pl., p. 493; DC., Prodr., iv. p. 625; Gray, Manual, ed. 5, p. 214 (*Fedia*).
Fedia radiata, Michx.? Chapm., Fl. Southern U.S., p. 184.

BERMUDAS.—Introduced. St David Island—*Lefroy.*

Mediterranean region, and naturalised in North America and other countries where it is cultivated.

COMPOSITÆ.

Ageratum conyzoides, Linn.

Ageratum conyzoides, Linn., Sp. Pl., ed. 1, p. 839; Griseb., Fl. Brit. W. Ind., p. 356; Chapm., Fl. Southern U.S., p. 189.

BERMUDAS.—Introduced. A common weed—*Lefroy.*

Generally dispersed in the warmer parts of America, and naturalised in many other countries.

Eupatorium fœniculaceum, Willd.

Eupatorium fœniculaceum, Willd., Sp. Pl., iii. p. 1750; Chapm., Fl. Southern U.S., p. 196.

BERMUDAS.—Indigenous. Roads near Hamilton—*Lane;* Pembroke marshes—*Lefroy;* a common weed on waste ground that has been cultivated—*Jones.*

Carolina to Florida.

Eupatorium conyzoides, Vahl.

Eupatorium conyzoides, Vahl, Symb., iii. p. 96; Griseb., Fl. Brit. W. Ind., p. 358; Chapm., Fl. Southern U.S., Suppl., p. 627.

BERMUDAS.—Introduced. Without locality—*Lefroy.*

South Florida, and West Indies and Mexico to Brazil.

Eupatorium macrophyllum, Linn.

Eupatorium macrophyllum, Linn., Sp. Pl., ed. 2, p. 1175; Hemsl. in Journ. Bot., 1883, p. 258.
Hebeclinium macrophyllum, DC., Prodr., v. p. 136; Griseb., Fl. Brit. W. Ind., p. 356.
Eupatorium bermudense latifolium flosculis pallescentibus, Silverweed, *nostratibus vulgo,* Pluk., Phytogr., t. 243.

BERMUDAS.—Introduced? In the Sloane Herbarium (xxii. p. 80, and xcvi. p. 28), British Museum—*Dickinson.*

Throughout the West Indies and southward to Brazil.

This plant is not in any of the modern collections, yet it is possible that it may still exist in the islands; for, as we have observed before, many of the indigenous plants are very rare and local.

Solidago sempervirens, Linn.

Solidago sempervirens, Linn., Sp. Pl., ed. 1, p. 878; Chapm., Fl. Southern U.S., p. 211; Gray, Manual, ed. 5, p. 242, et Proc. Am. Acad., xvii. p. 192.
Solidago mexicana, Linn., Sp. Pl., ed. 1, p. 879, fide Gray in Proc. Am. Acad., xvii. p. 178.
Solidago lævigata, Ait., Hort. Kew., ed. 1, iii. p. 215.
Solidago limonifolia, Pers., Ench., ii. p. 449.
Solidago azorica, Hochst. in Seub. Fl. Azor., p. 31, t. 10; Godm., Nat. Hist. Azor., p. 178.

BERMUDAS.—Indigenous. Rocks, seaside—*Lane;* low ground—*Jones;* without locality—*Rein;* common—*Reade.*

Maine to Florida, and in the Azores.

This common salt-marsh and sea-shore plant of eastern North America occurs abundantly in the Azores, and was described in the work of Seubert, cited above, as an endemic species. It is, however, certainly the same as the North American species, and it has been suggested that it was introduced into the Azores; but there would seem to be no more justification for this view than that the North American element in Ireland is wholly an introduced one. Seubert (1844) has the following record: "Ad littora marina ins. Terceira, Fayal, Pico et præsertim in ins. Flores copiosissima usque ad 1000 ped." And Watson, in Godman's Natural History of the Azores, pp. 178 and 269, quotes the islands named with S. Miguel and Corvo in addition. At that date (1870) its identity with the North American *Solidago sempervirens* had not been established, or, if it had, Watson was not aware of the circumstance. Nevertheless, he was so acute in discriminating the indigenous and introduced elements of a flora, and always prepared to meet with colonised plants, that this *Solidago* must have been very well established not to have excited in him a suspicion of its foreign origin.

Solidago mexicana, Linn., one of the synonyms of *Solidago sempervirens*, seems to have been erroneously recorded as Mexican, for there are no Mexican specimens in any of the herbaria consulted.

Solidago stricta, Ait.

Solidago stricta, Ait., Hort. Kew., ed. 1, iii. p. 216; Gray in Proc. Am. Acad., xvii. p. 192.
Solidago virgata, Michx., Fl. Bor.-Am., ii. p. 117; Chapm., Fl. Southern U.S., p. 211.
Solidago linoides, Solander; Gray, Manual, ed. 5, p. 243.
Solidago angustifolia, Ell., Bot. Carol., ii. p. 388.

BERMUDAS.—Indigenous? A universal weed—*Lefroy; Reade.*

Maine to Florida.

[*Aster tripolium*, Linn., is recorded in Jones's list as a common roadside plant; but we have seen no specimen, and it is very probable that the record originated in an error.]

Erigeron annuus, Pers.

Erigeron annuus, Pers., Ench., p. 431; Gray, Manual, ed. 5, p. 237; Fl. Dan., t. 486 (*Aster*).
Stenactis annua, Nees, Ast., p. 273; DC., Prodr., v. p. 298.

BERMUDAS.—Introduced. Without locality or other indication—*Rein.*

North America; introduced in Europe and some other countries.

Erigeron canadensis, Linn.

Erigeron canadensis, Linn., Sp. Pl., ed. 1, p. 863; Griseb., Fl. Brit. W. Ind., p. 365; Chapm., Fl. Southern U.S., p. 206.

BERMUDAS.—Introduced. A common weed—*Moseley; Reade.*

Canada to Brazil, and naturalised in many other countries of both hemispheres.

Erigeron darrellianus, Hemsl. (Plate I.)

Erigeron darrellianus, Hemsl.

Perennis, habitu foliisque *Conyzæ rivularis*, a qua differt capitulis, radiatis, minoribus, numerosioribus, &c.

Herba perennis, ut videtur, 1–2 ped. alta, basi lignosa, caulibus basi simplicibus, floriferis inferne exfoliatis, superne graciliter corymboso-paniculatis. *Folia* sessilia, confertissima, membranacea, oblongo-lanceolata vel oblanceolata, usque ad 3 poll. longa, apiculata, integra vel utrinque pauci apiculato-dentata, undique sparse pilosula, superiora gradatim minora, discreta. *Capitula* numerosissima, 3–4 lineas diametro; involucri bracteæ circiter 3-seriatæ, inæquales, lineares, margine scariosæ; ligulæ 30–35, 2-seriatæ (?) angustissimæ, bracteas 1–2 lineas superantes. *Achenia* (matura desunt) sparse pilosula; pappi setæ pauci-seriatæ, hispidulæ.—Journ. Bot., 1883, p. 104, t. 239, fig. 1.

Endemic.

Rocky places on the coast—*Lefroy; Moseley.*

This is compared in the foregoing description with *Conyza rivularis*, a Brazilian plant, which it closely resembles in habit, though the presence of a ray indicates the neighbouring genus *Erigeron*, as it is generally understood. Possibly it may prove to be a maritime form of some previously described species.

It has been dedicated to the Hon. J. H. Darrell, whose services to botany are mentioned in the introduction to this synopsis of the flora of the Bermudas.

In the Sloane Collection of the British Museum (xcvi. p. 29) there is a specimen collected by J. Dickinson, who found it growing among bushes and flowers. Dickinson calls this "Hog-weed," a name now applied, according to Lefroy, to *Boerhaavia erecta*.

Erigeron linifolius, Willd.

Erigeron linifolius, Willd., Sp. Pl., iii. p. 1955; Baker in Mart. Fl. Bras., fasc. lxxxvii. p. 31. *Conyza ambigua*, DC., Prodr., v. p. 381.

BERMUDAS.—Introduced. A common weed—*Lefroy; Lane; Moseley.* And in the British Museum, Sloane's Herbarium, xxxii. p. 83—*Dickinson.*

A native of Europe, now naturalised in many countries.

Erigeron philadelphicus, Linn.

Erigeron philadelphicus, Linn., Sp. Pl., ed. 1, p. 863; Chapm., Fl. Southern U.S., p. 206.

BERMUDAS.—Introduced? A common weed—*Lane; Jones; Rein; Lefroy.*

Canada to Florida.

Erigeron tenuis, Torr. and Gray.

Erigeron tenuis, Torr. and Gray, Fl. N. Am., ii. p. 175.
Erigeron quercifolius, Nutt. in DC. Prodr., v. p. 285 sed certe non Lam., ex Torr. and Gray.

BERMUDAS.—Introduced. Without locality—*Moseley.* Not included in any of the other collections, and probably only of casual occurrence in the islands.

Louisiana; Texas.

Baccharis glomeruliflora, Pers.

Baccharis glomeruliflora, Pers., Ench., ii. p. 423; Chapm., Fl. Southern U.S., p. 218.
Baccharis sessiliflora, Michx., Fl. Bor.-Am., ii. p. 125.

BERMUDAS.—Indigenous. Common in marshes—*Farlow; Lane; Moseley; Lefroy.*

North Carolina to Florida.

This is the "Dogwood" of the islanders; and the *Baccharis*, n. sp.? of Jones's list, and the *Baccharis heterophylla*, Linn., of Rein's list, is probably the same species, for there appears to be only one in the islands. "*Baccharis halimifolia*, Linn.," of Lane's list, is also doubtless the same species.

Pluchea odorata, Cass.

Pluchea odorata, Cass., Dict., xlii. p. 3; DC., Prodr., v. p. 452; Griseb., Fl. Brit. W. Ind., p. 366; Desc., Fl. Ant., iii. t. 217.

BERMUDAS.—Indigenous? Pembroke Marsh—*Lefroy.*

Florida and Mexico to New Grenada, and throughout the West Indies.

Lefroy states that this grows eight feet high, with a stem as thick as a man's wrist.

Pluchea purpurascens, DC.

Pluchea purpurascens, DC., Prodr. v. p. 452; Griseb. Fl. Brit. W. Ind., p. 367; Chapm., Fl. Southern U.S., p. 218.

BERMUDAS.—Indigenous. Shelly Bay and Warwick—*Lefroy.*

Florida and Mexico to New Grenada, and throughout the West Indies.

Pluchea camphorata, DC.

Pluchea camphorata, DC., Prodr., v. p. 452; Chapm., Fl. Southern U.S., p. 218; Gray, Manual, ed. 5, p. 247.

BERMUDAS.—Indigenous. Marshes—*Moseley.*

An inhabitant of salt marshes in eastern North America, ranging from North Carolina to Florida.

Polymnia uvedalia, Linn.

Polymnia uvedalia, Linn., Sp. Pl., ed. 2, p. 1303; Chapm., Fl. Southern U.S., p. 219; Gray, Manual, ed. 5, p. 248.

BERMUDAS.—Introduced. Escaped from cultivation—*Lane;* without locality—*Rein; Reade.*

New York to Florida.

Parthenium hysterophorus, Linn.

Parthenium hysterophorus, Linn., Sp. Pl., ed. 1, p. 988; Griseb., Fl. Brit. W. Ind., p. 369; Chapm., Fl. Southern U.S., p. 222.

BERMUDAS.—Introduced? Common—*Lefroy; Rein; Moseley; Reade.*

Florida and Mexico to Patagonia, chiefly in waste places and on roadsides.

Ambrosia artemisiæfolia, Linn.

Ambrosia artemisiæfolia, Linn., Sp. Pl., ed. 1, p. 988; Chapm., Fl. Southern U.S., p. 223; Griseb., Fl. Brit. W. Ind., p. 370.

BERMUDAS.—Introduced. Roadsides—*Lane; Lefroy.*

Canada to Brazil, especially in cultivated ground and waste places.

The "*Ambrosia heterophylla*, DC.," of Jones's list is perhaps the same species.

Eclipta erecta, Linn.

Eclipta erecta, Linn. ex DC. Prodr., v. p. 490; Chapm., Fl. Southern U.S., p. 224; Griseb., Fl. Brit. W. Ind., p. 370, sub *Eclipta alba.*

BERMUDAS.—Indigenous? Marshes—*Moseley;* abundant in wet ditches—*Lefroy.*

Pennsylvania to Uruguay, and widely diffused in the Old World.

Borrichia arborescens, DC. (Plate II.)

Borrichia arborescens, DC., Prodr., v. p. 489; Griseb., Fl. Brit. W. Ind., p. 371; Chapm., Fl. Southern U.S., p. 224.
Buphthalmum arborescens, Linn., Sp. Pl., ed. 2, p. 1273.
Chrysanthemum bermudense, folio rigido-viridi, Moris., Hist. Pl., pars iii. p. 25.
Borrichia argentea, DC., Prodr., v. p. 489.

BERMUDAS.—Indigenous. Abundant along the whole coast-line—*Rein; Jones; Moseley; Lefroy;* Boaz Island—*Reade.*

The Keys of Florida, and through the West Indies to Peru.

Morison, who appears to have first described this plant, drew up his description from Bermudan plants cultivated at Hampton Court before 1699.

This and *Borrichia frutescens* are the only two species of the genus; and both species are remarkable for a peculiarity in the foliage that has led to their being subdivided into three or four species. Usually the leaves are clothed all over with hairs, and those of *Borrichia arborescens* with a dense soft down; but side by side with plants thus clothed with hairs others are occasionally found with perfectly glabrous glossy foliage. Other plants occur in which some of the leaves are hairy and some quite glabrous. In all cases, probably, the leaves are hairy when quite young; and the hairs, which are clearly of a very deciduous nature, are from some cause shed early where the leaves are naked. Throughout its range of distribution it inhabits calcareous, rocky, or other dry situations.

Borrichia frutescens, DC. (Plate III.)

Borrichia frutescens, DC., Prodr., v. p. 489; Chapm., Fl. Southern U.S., p. 224.
Buphthalmum frutescens, Linn., Sp. Pl., ed. 1, p. 903.

Bermudas.—Indigenous. Seaside—*Lane*; *Lefroy*.

North Carolina to Florida, and in Mexico.

Linnæus records this species from the West Indies, and cites Sloane's *Chrysanthemum fruticosum maritimum* (Hist. Jam., i. p. 260), which probably belongs to *Borrichia arborescens*.

Bidens pilosa, Linn.

Bidens pilosa, Linn., Sp. Pl., ed. 1, p. 832.
Bidens leucantha, Willd., Sp. Pl., iii. p. 1719; Griseb., Fl. Brit. W. Ind., p. 373; Chapm., Fl. Southern U.S., p. 237.

Bermudas.—Introduced. Roadsides, &c.—*Lane*; *Rein*; *Moseley*.

A common weed in nearly all warm countries.

Senecio vulgaris, Linn.

Senecio vulgaris, Linn., Sp. Pl., ed. 1, p. 867; Gray, Manual, ed. 5, p. 271; DC., Prodr., vi. p. 341.

Bermudas.—Introduced. Cultivated ground—*Jones*; *Lefroy*.

Europe, and naturalised in most temperate regions where Europeans have settled.

Cichorium intybus, Linn.

Cichorium intybus, Linn., Sp. Pl., ed. 1, p. 813; Gray, Manual, ed. 5, p. 275; DC., Prodr., vii. p. 84.

Bermudas.—Introduced. Common—*Lane*; *Jones*; *Reade*.

Europe, Northern Africa to North-Western India.

Crepis japonica, Benth.

Crepis japonica, Benth., Fl. Hongk., p. 194; Hook., Fl. Brit. Ind., iii. p. 395.
Youngia lyrata, Cass., Opusc., iii. p. 86; DC., Prodr., vii. p. 192–193, spp. 1–8.

BERMUDAS.—Introduced. Waste ground—*Lefroy*. Not naturalised in North America, and apparently casual in the islands.

India and Eastern Asia.

Taraxacum officinale, Wigg.

Taraxacum officinale, Wigg., Prim. Fl. Hols., p. 56; Boiss., Fl. Or., iii. p. 787; Griseb., Fl. Brit. W. Ind., p. 384.
Taraxacum dens-leonis, Desf., Fl. Atl., ii. p. 228; Chapm., Fl. Southern U.S., p. 252.

BERMUDAS.—Introduced. *Lane; Jones.*

Indigenous in both north and south temperate and cold regions, and one of the most widely dispersed weeds of cultivation.

Sonchus oleraceus, Linn.

Sonchus oleraceus, Linn., Sp. Pl., ed. 1, p. 794; Chapm., Fl. Southern U.S., p. 253; Griseb., Fl. Brit. W. Ind., p. 384.

BERMUDAS.—Introduced. Common—*Rein; Reade.*

Almost everywhere in both hemispheres except in the colder regions.

Sonchus asper, Vill.

Sonchus asper, Vill., Delph., iii. p. 158; Chapm., Fl. Southern U.S., p. 253; Griseb., Fl. Brit. W. Ind., p. 385.

BERMUDAS.—Introduced. Common—*Rein; Reade.*

Also very widely dispersed, and recorded as certainly indigenous in New Zealand, as well as northern countries.

GOODENOVIEÆ.

Scævola lobelia, Linn.

Scævola lobelia, Linn., Syst. Veg., ed. xiii. (Murray), p. 178, excl. syn. Rumph. ex Hiern in Oliv. Fl. Trop. Afr., iii. p. 462.
Scævola plumieri, Vahl, Symb., ii. p. 36; Griseb., Fl. Brit. W. Ind., p. 388; Chapm., Fl. Southern U.S., p. 256.

BERMUDAS.—Indigenous. Abundant on the sea-shore—*Rein; Moseley; Reade.*

A maritime shrub, common on the sea-shores of the warmer parts of America, Africa, and Asia.

PLUMBAGINEÆ.

Statice lefroyi, Hemsl. (Plate IV.)

Statice lefroyi, Hemsl.

Statice bahusiensi affinis, differt scaporum multo elatiorum ramulis gracillimis rectiusculis bracteis floribusque triente parte brevioribus, &c.

Herba glabra, siccitate pallida, saltem bipedalis. *Folia* oblonga, lanceolata vel oblanceolata, apice obtusissima vel rotundata, sub apice mucrone recto rigidiusculo instructa, basi in petiolum longissimum decurrentia, distincte pennivenia, cum petiolo 6–12 poll. longa. *Scapus* bipedalis, fistulosus, parte inferiore (saltem in siccis), angulatus, anguste ramoso-paniculatus, ramulis ultimis filiformibus fere rectis; spiculæ dissitæ, 1–2-floræ, sed sæpissime 1-floræ, cum calyce circiter 3-lineas longæ; bracteæ late scarioso-hyalinæ, vix acutæ, extima $\frac{3}{4}$ lineam longa, intima $2\frac{1}{2}$ lineas longa. *Flores* cærulei; calycis tubus costatus, costis sat setulosis; limbi lobis subacutis; petala ima basi tantum coalita, obovata, emarginata, calycem vix æquantia; filamenta leviter dilatata; ovarium glabrum, 5-angulatum; styli a basi liberi, stigmatibus subclavatis.—Journ. Bot., 1883, p. 105.

Bermudas.—Endemic. Salt marsh, Walsingham—*Lefroy.*

This is probably the same species identified by Rein as *Statice caroliniana*, Nutt. What the true *Statice caroliniana* is we have not been able to determine. Chapman (Flora of the Southern United States, p. 278) retains it as a distinct species, and describes the calyx as smooth. Gray (Manual of the Botany of the Northern United States, ed. 5, p. 313) regards it as a variety of *Statice limonium*, Linn. The Bermudan plant, however, is sufficiently distinct from all the North American specimens that we have seen to rank as a distinct species. It is also very different from *Statice bahamensis*, Griseb. Its nearest affinity, apparently, is with *Statice bahusiensis*, Fries., from which it is distinguishable at a glance, though the technical characters that separate the species are slight. The differences are chiefly in the habit and stature of the plant; the mode of branching of the panicle; the slenderness and straightness of the ultimate branchlets of the panicle; the size of the spikelets; and the size, consistence, and shape of the bracts. Further, it differs from all the species we know in having the corolla shorter than the calyx. We at first thought the artist had made a mistake, as the twisted corollas are very difficult to open out; but our own examination of flowers verified the drawing as to the condition in the dried state. In the specimens collected by Sir J. H. Lefroy, the only ones we have seen, the flowers are all past their prime.

PRIMULACEÆ.

Anagallis arvensis, Linn.

Anagallis arvensis, Linn., Sp. Pl., ed. 1, p. 148; Chapm., Fl. Southern U.S., p. 281.

BERMUDAS.—Introduced. Very common—*Michaux; Lane; Jones; Rein; Moseley; Lefroy.*

Northern temperate regions, &c., of the Old World, and naturalised in North America.

OLEACEÆ.

Olea europæa, Linn.

Olea europæa, Linn., Sp. Pl., ed. 1, p. 8; DC., Prodr., viii. p. 284; Proc. and Trans. Nova Scotia Inst. Nat. Sc., 1873, p. 262.

BERMUDAS.—Introduced. Common in some parts of the islands—*Jones; Moseley; Lefroy.*

Introduced from Europe soon after the settlement of the islands.

The "*Olea americana*, Linn.," of Lane's list, is probably an error, as that species has not been found by later collectors.

Forestiera porulosa, Poir.

Forestiera porulosa, Poir. in Lam. Encycl. Suppl., ii. p. 664; Griseb., Fl. Brit. W. Ind., p. 406 (excl. syn. *Piptolepis phillyreoides*, Benth.); Chapm., Fl. Southern U.S., p. 370.
Myrica segregata, Jacq., Ic. Pl. Rar., t. 625.

BERMUDAS.—Indigenous. Walsingham—*Lefroy;* Boaz Island—*Reade.*

Florida; West Indies.

Sir J. H. Lefroy and Mr Reade are the only collectors of this interesting shrub, the female of which, the former states, is very rare. The Bermudan specimens have rather larger leaves than the Floridan and West Indian, and the pores, so conspicuous in the other specimens, are almost obsolete in the Bermudan. Specimens in the Kew Herbarium cultivated in Europe, and Jacquin's figure, come much nearer the insular plant.

We suspect this to be the "Wild Olive" of the first settlers.

Jasminum gracile, Andr.

Jasminum gracile, Andr., Bot. Repos., t. 127; Griseb., Fl. Brit. W. Ind., p. 406.
Jasminum geniculatum, Vent., Choix., t. 8.
Jasminum volubile, Jacq., Hort. Schœnb., t. 321.

BERMUDAS.—Introduced. Common among rocks at the caves near Walsingham—*Lefroy;* without locality—*Reade.*

Pacific Islands. Naturalised in Jamaica.

APOCYNACEÆ.

Nerium oleander, Linn.

Nerium oleander, Linn., Sp. Pl., ed. 1, p. 209; DC., Prodr., viii. p. 420; Gray, Synop. Fl. N. Am., ii. p. 79.

BERMUDAS.—Introduced. Common in a wild state—*Rein; Jones; Lefroy.*

Southern Europe and Western Asia. Introduced into the Bermudas about eighty years ago, and commonly planted for hedges; and now one of the most general and conspicuous shrubs in the islands.

ASCLEPIADEÆ.

Asclepias curassavica, Linn.

Asclepias curassavica, Linn., Sp. Pl., ed. 1, p. 215; Griseb., Fl. Brit. W. Ind., p. 419; Chapm., Fl. Southern U.S., p. 364; Desc., Fl. Ant., ii. p. 116.

BERMUDAS.—Introduced. Common throughout the islands—*Lane; Rein; Jones.*

Florida, West Indies, and Tropical America generally; and now naturalised in most other warm countries.

According to Mr Jones, the leaves of this plant form the only food in the islands of the caterpillar of *Danais archippus*.

LOGANIACEÆ.

Buddleia madagascariensis, Lam.

Buddleia madagascariensis, Lam., Encycl., i. p. 513; DC., Prodr., x. p. 447; Bot. Mag., t. 2824.

BERMUDAS.—Introduced. *Moseley; Lefroy.*

Madagascar and Mauritius; and naturalised in many other countries.

Jones's list includes *Buddleia americana*, Linn., which he states is common by the road-side in Paget parish. It is widely spread in the West Indies and Tropical and Sub-tropical America.

GENTIANEÆ.

Erythræa texensis, Griseb.

Erythræa texensis, Griseb., Gen. et Sp. Gent., p. 139; Gray, Synop. Fl. N. Am., ii. p. 112.

BERMUDAS.—Introduced. Common—*Lefroy; Moseley; Reade.*

Texas.

All the specimens that we have seen certainly belong to this species. Jones, however, enumerates *Erythræa ramosissima*, Pers., a European species which is naturalised in some

parts of North America. He states that it is a very common weed in the islands. Lane's list includes *Erythræa centaurium*, Pers. It is possible, of course, that all three species have been introduced; but as only one occurs in the collections, it is probable that only that one exists in the islands.

HYDROPHYLLACEÆ.

Nama jamaicense, Linn.

Nama jamaicense, Linn., Sp. Pl., ed. 2, p. 327; Griseb., Fl. Brit. W. Ind., p. 477; Chapm., Fl. Southern U.S., p. 337.

BERMUDAS.—Indigenous? Roadsides, &c.—*Lane; Rein; Moseley; Lefroy.*

Florida; Texas; Mexico; West Indies.

BORAGINEÆ.

Tournefortia gnaphalodes, R. Br.

Tournefortia gnaphalodes, R. Br., Prodr. Fl. N. Holl., p. 496, *in nota*; Griseb., Fl. Brit. W. Ind., p. 483; Chapm., Fl. Southern U.S., p. 329.

Heliotropium gnaphalodes, Linn., Syst. Nat., ed. 10, ii. p. 913; Jacq., Sel. Stirp. Am., p. 25, t. 173, fig. 11.

BERMUDAS.—Indigenous. Common on the coast—*Lane; Rein; Moseley; Lefroy.*

Florida and throughout the West Indies, especially in maritime districts.

Tournefortia laurifolia, Vent., is in Jones's list, though without locality or other note.

Heliotropium curassavicum, Linn.

Heliotropium curassavicum, Linn., Sp. Pl., ed. 1, p. 130; Griseb., Fl. Brit. W. Ind., p. 486; Chapm., Fl. Southern U.S., p. 330.

BERMUDAS.—Indigenous? Salt marshes—*Lefroy.*

North Carolina to Patagonia; also common on the coasts of Australia, Southern Africa, and some of the Pacific Islands.

CONVOLVULACEÆ.

Ipomœa jamaicensis, G. Don.

Ipomœa jamaicensis, G. Don, Gen. Syst., iv. p. 278; Griseb., Fl. Brit. W. Ind., p. 473; Mart., Fl. Bras., vii. p. 225.

BERMUDAS.—Indigenous? Without locality—*Rein.*

Jamaica; Panama; Brazil.

Ipomœa acuminata, Rœm. et Schult.

Ipomœa acuminata, Rœm. et Schult., Syst. Veg., iv. p. 228; Griseb., Fl. Brit. W. Ind., p. 473.
Pharbitis acuminata, Choisy in DC. Prodr., ix. p. 342.

BERMUDAS.—Indigenous? Without locality—*Moseley.*

West Indies and Guatemala to Brazil.

Ipomœa nil, Roth.

Ipomœa nil, Roth, Cat. Bot., i. p. 36; Griseb., Fl. Brit. W. Ind., p. 473.
Pharbitis nil, Choisy in DC. Prodr., ix. p. 343, *pro parte*; Chapm., Fl. Southern U.S., p. 342.

BERMUDAS.—Introduced. Without locality or memorandum—*Lefroy*.

Generally diffused in the warmer parts of America, Africa, Asia, and Australia.

Ipomœa pes-capræ, Sweet.

Ipomœa pes-capræ, Sweet, Hort. Suburb. Londin., p. 35; DC., Prodr., ix. p. 349; Griseb., Fl. Brit. W. Ind., p. 470; Chapm., Fl. Southern U.S., p. 342.

BERMUDAS.—Indigenous. Common on the sandy parts of the coast—*Lane; Rein; Moseley*.

General on sandy sea-shores throughout the tropics, and extending to sub-tropical countries.

Ipomœa purpurea, Lam.

Ipomœa purpurea, Lam. ex Meissn., in Mart. Fl. Bras., vii. p. 223; Griseb., Fl. Brit. W. Ind., p. 473.
Pharbitis hispida, Choisy in DC. Prodr., ix. p. 341; Chapm., Fl. Southern U.S., p. 342.
Convolvulus purpureus, Linn., Sp. Pl., ed. 2, p. 219.

BERMUDAS.—Introduced. Caves, Walsingham—*Lane*.

West Indies and Tropical America. Naturalised in many other countries.

Ipomœa sagittata, Cav.

Ipomœa sagittata, Cav., Ic. Pl., ii. p. 4, t. 107; Gray, Synop. Fl. N. Am., ii. p. 212.
Ipomœa sagittifolia, Ker, Bot. Reg., t. 437; Chapm., Fl. Southern U.S., p. 344.
Convolvulus sagittifolius, Michx., Fl. Bor.-Am., i. p. 138.

BERMUDAS.—Indigenous? Shelly Bay Swamp—*Lefroy*.

North Carolina to Florida and Texas; also Spain and Barbary.

A salt-marsh and maritime plant, probably introduced in the Old World.

Ipomœa villosa, Ruiz et Pav.

Ipomœa villosa, Ruiz et Pav., Fl. Peruv. et Chil., ii. p. 12, t. 121, fig. b.; Griseb., Fl. Brit. W. Ind., p. 473.

BERMUDAS.—Indigenous? Shelly Bay Swamp—*Lefroy*.

West Indies; Peru. A maritime plant which, like some other species of the genus, probably springs up from seed cast ashore by the waves.

Convolvulus jamaicensis, Jacq.

Convolvulus jamaicensis, Jacq., Obs., iii. p. 6; Griseb., Fl. Brit. W. Ind., p. 474.

BERMUDAS.—Indigenous? Without locality—*Rein*.

Bahamas to Hayti and Jamaica, where it is almost confined to the coast region.

Dichondra repens, Forst.

Dichondra repens, Forst., Char. Gener., p. 40, t. 20; Griseb., Fl. Brit. W. Ind., p. 476; Chapm. Fl. Southern U.S., p. 346.

BERMUDAS.—Indigenous. Marshes—*Moseley;* pastures—*Lane;* without locality—*Rein.*

Generally diffused in Temperate and Tropical America, Tropical Asia, Southern Africa, Australia, New Zealand, and the Pacific Islands.

SOLANACEÆ.

Solanum aculeatissimum, Jacq.

Solanum aculeatissimum, Jacq., Ic. Pl. Rar., t. 41; Griseb., Fl. Brit. W. Ind., p. 442; Chapm., Fl. Southern U.S., p. 349.

BERMUDAS.—Introduced? Without locality—*Rein.*

A widely spread species in Tropical and Sub-tropical America.

Mr Moseley collected an imperfect specimen of a *Solanum*, which may be this, or *Solanum mammosum*, Linn.; and Sir J. H. Lefroy records *Solanum torvum*, Sw., in his list, on the authority of the late General Munro. The latter is also in Jones's list.

Solanum nigrum, Linn.

Solanum nigrum, Linn., Sp. Pl., ed. 1, p. 186; Chapm., Fl. Southern U.S., p. 348.
Solanum nodiflorum, Jacq., Ic. Pl. Rar., t. 326; Griseb., Fl. Brit. W. Ind., p. 437.

BERMUDAS.—Introduced. Waste places—*Lane; Rein.*

This is now generally diffused in temperate and tropical regions throughout the world.

Nicandra physaloides, Gærtn.

Nicandra physaloides, Gærtn., Fruct., ii. p. 237, t. 131; Chapm., Fl. Southern U.S., p. 351.

BERMUDAS.—Introduced. Ireland Island—*Lane.*

Peru, and naturalised in most warm countries.

Physalis lanceolata, Michx.

Physalis lanceolata, Michx., Fl. Bor.-Am., i. p. 149; Chapm., Fl. Southern U.S., p. 350.

BERMUDAS.—Introduced. Walsingham—*Lane.*

Florida to North Carolina, in dry sandy soil and near the sea.

[*Physalis peruviana*, Linn., a commonly cultivated and widely spread species, is included in Jones's list.]

Datura stramonium, Linn.

Datura stramonium, Linn., Sp. Pl., ed. 1, p. 179; Griseb., Fl. Brit. W. Ind., p. 434; Chapm., Fl. Southern U.S., p. 352.

BERMUDAS.—Introduced. Common—*Lane; Jones; Rein; Lefroy.*

General in the temperate and tropical zones of both hemispheres, though it is uncertain where it is really indigenous.

Datura tatula, Linn.

Datura tatula, Linn., Sp. Pl., ed. 2, p. 256; Griseb., Fl. Brit. W. Ind., p. 434.

Datura stramonium β *tatula*, Dcne. in DC. Prodr., xiii. 1, p. 540; Chapm., Fl. Southern U.S., p. 352.

BERMUDAS.—Introduced. Paget parish—*Lefroy.*

Nearly as widely dispersed as the last, of which some botanists regard it as a variety.

Nicotiana tabacum, Linn.

Nicotiana tabacum, Linn., Sp. Pl., ed. 1, p. 180; Griseb., Fl. Brit. W. Ind., p. 434.

BERMUDAS.—Introduced. Roadsides—*Jones.*

Tobacco was cultivated by the earliest settlers, and often springs up in a wild condition.

In Silvester Jourdan's narrative of A Discovery of the Barmudas, otherwise called the Isle of Divels (Hakluyt, new ed. v. p. 558), it is stated that very good tobacco was found wild in the islands by Sir George Somers and his people, wrecked there in 1609.

Nicotiana glauca, Grah., an arboreous species, was sent from Pembroke churchyard by Sir J. H. Lefroy and Mr Reade, where it was probably planted.

SCROPHULARINEÆ.

Verbascum thapsus, Linn.

Verbascum thapsus, Linn., Sp. Pl., ed. 1, p. 177; Chapm., Fl. Southern U.S., p. 288; Gray, Manual, ed. 5, p. 325.

BERMUDAS.—Introduced. Common—*Michaux; Lane; Jones; Lefroy.*

Europe and temperate Asia.

This is locally known as "Aaron's Rod;" and it was very common in 1806, when Michaux visited the islands. Jones states that it is one of the most striking plants.

Linaria elatine, Mill.

Linaria elatine, Mill., Dict., n. 16; DC., Prodr., x. p. 268; Chapm., Fl. Southern U.S., p. 291.

BERMUDAS.—Introduced. A common weed in cultivated ground—*Rein; Reade.*

Europe, Northern Africa, and Western Asia, and naturalised in other countries.

Linaria vulgaris, Mill.

Linaria vulgaris, Mill., Dict.; DC., Prodr., x. p. 273; Chapm., Fl. Southern U.S., p. 290; Griseb., Fl. Brit. W. Ind., p. 431.

BERMUDAS.—Introduced. Common in cultivated ground—*Jones; Reade.*

Europe and Northern Asia; introduced in North America and elsewhere.

Pentstemon pubescens, Solander.

Pentstemon pubescens, Solander in Ait. Hort. Kew, ed. 1, iii. p. 360; Chapm., Fl. Southern U.S., p. 290.

BERMUDAS.—Introduced. Without locality—*Rein.*

A native of eastern North America, ranging from Canada to Florida and Texas.

Herpestis monniera, H. B. K.

Herpestis monniera, H. B. K., Nov. Gen. et Sp., ii. p. 366; Griseb., Fl. Brit. W. Ind., p. 430; Chapm., Fl. Southern U.S., p. 292.

BERMUDAS.—Indigenous. Somerset Island—*Lefroy;* without locality—*Rein; Reade.*

Nearly all tropical and sub-tropical countries; inhabiting marshy and maritime places.

Capraria biflora, Linn.

Capraria biflora, Linn., Sp. Pl., ed. 1, p. 628; Griseb., Fl. Brit. W. Ind., p. 427; Chapm., Fl. Southern U.S., p. 296.

BERMUDAS.—Introduced. Paget parish—*Lefroy;* Hamilton—*Lane.*

Florida and Mexico to Peru and Brazil.

Locally known as "Tea-plant." "Introduced into the islands about fifty years ago by Dr Hinson."—J. H. Darrell in a communication to Sir J. H. Lefroy.

Veronica agrestis, Linn.

Veronica agrestis, Linn., Sp. Pl., ed. 1, p. 13; Chapm., Fl. Southern U.S., p. 296; Gray, Manual, ed. 5, p. 333.

BERMUDAS.—Introduced. *Lane; Lefroy; Reade.*

North temperate zone in the Old World, and naturalised in many other parts of the world.

Veronica arvensis, Linn.

Veronica arvensis, Linn., Sp. Pl., ed. 1, p. 13; Chapm., Fl. Southern U.S., p. 296.

BERMUDAS.—Introduced. *Moseley; Lefroy.*

North temperate zone in the Old World, and introduced into other countries.

Veronica peregrina, Linn.

Veronica peregrina, Linn., Sp. Pl., ed. 1, p. 14; Gray, Manual, ed. 5, p. 333; Chapm., Fl. Southern U.S., p. 295.

BERMUDAS.—Introduced. Collected only by Lefroy.

A very widely spread weed of cultivation, supposed by some writers to be of American origin, though Gray states that it appears like an introduced weed in the Northern States.

BIGNONIACEÆ.

Crescentia cujete, Linn.

Crescentia cujete, Linn., Sp. Pl., ed. 1, p. 626; Griseb., Fl. Brit. W. Ind., p. 445; Desc., Fl. Ant., iv. p. 244.

BERMUDAS.—Introduced. Common in low grounds—*Lane; Jones; Rein.*

West Indies and Mexico to Brazil, commonly growing in marshy and swampy places.

Rein states that this tree has every appearance of being indigenous, yet he suspects that it was originally introduced.

[*Tecoma pentaphylla*, DC., locally known as "White Cedar," a West Indian arboreous member of this order, is commonly cultivated in the islands.]

VERBENACEÆ.

Phryma leptostachya, Linn.

Phryma leptostachya, Linn., Sp. Pl., ed. 1, p. 601; Chapm., Fl. Southern U.S., p. 310.

BERMUDAS.—Indigenous? *Moseley; Lefroy.*

General in eastern North America; also in Northern India, China, and Japan.

Lantana camera, Linn.

Lantana camera, Linn., Sp. Pl., ed. 1, p. 627; Griseb., Fl. Brit. W. Ind., p. 495; Chapm., Fl. Southern U.S., p. 308.

BERMUDAS.—Introduced. Common—*Moseley; Jones.*

Generally spread in the warmer parts of America, and now naturalised in many other countries.

Jones states that a few years ago it was only known in a few localities, but is now (1873) fast spreading over the islands. In shaded places it grows luxuriantly, running up among the branches of the cedars to a height of twenty or thirty feet. "Prickly Sage", and "Red Sage" of the islanders. In a communication to Sir J. H. Lefroy, the Hon. J. H. Darrell states that it was introduced into the islands from Madeira, about 1818 or 1819, by Mr Tucker of River's Island.

Lantana crocea, Jacq.

Lantana crocea, Jacq., Hort. Schœnb., t. 473; Griseb., Fl. Brit. W. Ind., p. 496.

BERMUDAS.—Introduced. Without any locality or remarks—*Rein.*

West Indies; Guiana.

Lantana involucrata, Linn.

Lantana involucrata, Linn., Amœn. Acad., iv. p. 319; Chapm., Fl. Southern U.S., p. 308; Griseb., Fl. Brit. W. Ind., p. 496.
Lantana odorata, Linn., Syst. Nat., ed. 13, ii. p. 418.

BERMUDAS.—Introduced. Common all over the islands—*Lane; Holton; Jones; Rein; Lefroy.*

Florida, West Indies, Mexico, and north part of South America.

This is apparently the commonest shrubby plant in the islands, where it is known as the "Common Sage." It was abundant when Michaux visited the islands in 1806, and were there not evidence to the contrary, we should have supposed that it reached them independently of human agency. The Hon. J. H. Darrell writes concerning this shrub—"This was brought here from the Bahamas (as I was told by my father) by Colonel Spofforth, in the latter part of the last century, with the view of using it as fuel for ovens and lime-kilns, so as to diminish the great consumption of cedar trees for those purposes."

Lippia nodiflora, Michx.

Lippia nodiflora, Michx., Fl. Bor.-Am., ii. p. 15; Chapm., Fl. Southern U.S., p. 308; Griseb., Fl. Brit. W. Ind., p. 494.

BERMUDAS.—Indigenous. Common—*Moseley; Rein; Lefroy; Reade.*

Cosmopolitan in tropical and sub-tropical regions, flourishing in almost any soil or situation. The "*Lippia reptans*" of Lane's list is probably this plant.

Stachytarpheta jamaicensis, Vahl.

Stachytarpheta jamaicensis, Vahl, Enum., i. p. 206; Griseb., Fl. Brit. W. Ind., p. 494; Chapm., Fl. Southern U.S., p. 308 (*Stachytarpha*).

BERMUDAS.—Indigenous? Very common—*Lane; Jones; Lefroy; Moseley.*

Florida and Mexico to Brazil, and naturalised in Tropical Asia and Africa.

Priva echinata, Juss.

Priva echinata, Juss. in Ann. Mus. Hist. Nat. Par., vii. p. 69; Griseb., Fl. Brit. W. Ind., p. 493; Chapm., Fl. Southern U.S., p. 306.

BERMUDAS.—Indigenous? *Munro.*

Florida and Mexico to Brazil: a plant easily disseminated by means of the hooked hairs on the seed-vessel.

Verbena urticæfolia, Linn.

Verbena urticæfolia, Linn., Sp. Pl., ed. 1, p. 20; Griseb., Fl. Brit. W. Ind., p. 493; Chapm., Fl. Southern U.S., p. 307.

BERMUDAS.—Indigenous? Without locality—*Moseley*. Also in the Sloane Herbarium, clix. p. 47 ("a strong emetick").

Canada to Florida, Mexico, and the West Indies.

Lefroy records *Verbena officinalis*, Linn., in his list, a plant not unlikely to occur.

[*Citharexylum quadrangulare*, Jacq., is in some collections, whether wild or not has not been ascertained.]

Duranta plumieri, Jacq.

Duranta plumieri, Jacq., Sel. Stirp. Am., p. 186, t. 176, fig. 76; Griseb., Fl. Brit. W. Ind., p. 498; Chapm., Fl. Southern U.S., p. 309.

BERMUDAS.—Indigenous? Quite common—*Lefroy*; *Moseley*; *Reade*.

Florida and Mexico to Brazil; also in Tropical Africa.

[In the Banksian collection at the British Museum, there is a flowering specimen of a *Petræa* (*Petræa volubilis?*) from "Bermudas."]

Avicennia nitida, Jacq.

Avicennia nitida, Jacq., Sel. Stirp. Am., p. 177, t. 112, fig. 1; Griseb., Fl. Brit. W. Ind., p. 502; Gray, Synop. Fl. N. Am., ii. p. 341.

Avicennia tomentosa, Nutt.? and *Avicennia tomentosa*, Jacq. in Chapm., Fl. Southern U.S., p. 310.

BERMUDAS.—Indigenous. Everywhere in salt marshes associated with *Rhizophora*—*Lane*; *Rein*; *Jones*; *Moseley*; *Lefroy*.

Florida, West Indies, and Mexico to Brazil; also in Tropical Africa.

Locally known as "Black Mangrove."

LABIATÆ.

Mentha rotundifolia, Linn.

Mentha rotundifolia, Linn., Sp. Pl., ed. 2, p. 805; Chapm., Fl. Southern U.S., p. 312.

BERMUDAS.—Introduced. Wild by roadsides—*Lefroy*; *Reade*.

Europe, North Africa, and Temperate Asia, though frequently occurring only as a colonist.

Pycnanthemum muticum, Pers.

Pycnanthemum muticum, Pers., Ench., ii. p. 128; Chapm., Fl. Southern U.S., p. 315.

Brachystemum muticum, Michx., Fl. Bor.-Am., ii. p. 6, t. 32.

BERMUDAS.—Introduced. Without locality—*Rein*.

Maine to Ohio and Florida, usually growing in dry or sandy soil.

Calamintha officinalis, Mœnch.

Calamintha officinalis, Mœnch, Meth. Pl., p. 409; DC., Prodr., xii. p. 228.
Melissa calamintha, Linn., Sp. Pl., ed. 1, p. 593.

BERMUDAS.—Introduced. Without locality—*Rein*.

North temperate regions of the Old World, formerly commonly cultivated.

Salvia coccinea, Linn.

Salvia coccinea, Linn., fil., Sp. Pl. Suppl., p. 88; Griseb., Fl. Brit. W. Ind., p. 490; Gray, Synop. Fl. N. Am., ii. p. 368.

BERMUDAS.—Introduced. Common—*Lane; Rein; Moseley*.

Carolina to Florida ("but probably introduced"—*A. Gray*), West Indies, Mexico, and South America.

Salvia occidentalis, Swartz.

Salvia occidentalis, Swartz, Fl. Ind. Occ., i. p. 43; Griseb., Fl. Brit. W. Ind., p. 490; Gray, Synop. Fl. N. Am., ii. p. 370.

BERMUDAS.—Introduced? Walsingham—*Lane*; without locality—*Moseley*.

Florida, West Indies, and Mexico to Peru, abounding in waste places and as a weed of cultivation.

Salvia serotina, Linn.

Salvia serotina, Linn., Mant., p. 25; Griseb., Fl. Brit. W. Ind., p. 490; Chapm., Fl. Southern U.S., p. 319.

BERMUDAS.—Introduced? Roadsides, &c.—*Lane; Rein; Moseley*.

South Florida, and throughout the West Indies.

Marrubium vulgare, Linn.

Marrubium vulgare, Linn., Sp. Pl., ed. 1, p. 583; Gray, Synop. Fl. N. Am., ii. p. 384.

BERMUDAS.—Introduced. *Rein*.

North temperate regions of the Old World, and introduced into North America.

Sideritis romana, Linn.

Sideritis romana, Linn., Sp. Pl., ed. 1, p. 575; DC., Prodr., xii. p. 445; Sibthorp, Fl. Græc., t. 552.

BERMUDAS.—Introduced. *Rein*.

An inhabitant of the Mediterranean region, and probably only of casual occurrence in the islands.

Leonurus sibiricus, Linn.

Leonurus sibiricus, Linn., Sp. Pl., ed. 1, p. 584; Griseb., Fl. Brit. W. Ind., p. 491; Gray, Synop. Fl. N. Am., ii. p. 385.

BERMUDAS.—Introduced. Roadsides—*Moseley; Lefroy*.

Europe and Siberia, and naturalised in many other countries.

Lamium amplexicaule, Linn.

Lamium amplexicaule, Linn., Sp. Pl., ed. 1, p. 579; Chapm., Fl. Southern U.S., p. 325.

BERMUDAS.—Introduced. *Rein; Moseley.*

North temperate regions of the Old World, and naturalised in many other countries.

PLANTAGINACEÆ.

Plantago lanceolata, Linn.

Plantago lanceolata, Linn., Sp. Pl., ed. 1, p. 113; Chapm., Fl. Southern U.S., p. 278.

BERMUDAS.—Introduced. Common—*Lane; Rein; Moseley.*

North temperate regions of the Old World, and widely dispersed as a colonist.

Plantago major, Linn.

Plantago major, Linn., Sp. Pl., ed. 1, p. 112; Chapm., Fl. Southern U.S., p. 277; Griseb., Fl. Brit. W. Ind., p. 389.

BERMUDAS.—Introduced. Very common—*Michaux; Lane; Rein; Moseley.*

Indigenous or naturalised in all temperate and tropical climates.

Plantago virginica, Linn.

Plantago virginica, Linn., Sp. Pl., ed. 1, p. 113; Chapm., Fl. Southern U.S., p. 278; Griseb., Fl. Brit. W. Ind., p. 389.

BERMUDAS.—Indigenous? Without locality—*Lane; Lefroy;* Boaz Island—*Reade.*

New England to Florida, Mexico, and West Indies.

Mr Reade writes: "When first I came here [Royal Naval Hospital] *Plantago virginica* was very common on unenclosed land around my house; but when I put poultry on the ground they exterminated it by eating the unexpanded flower-buds, while the introduced species, *Plantago media* [*major?*] and *Plantago lanceolata*, thrive vigorously. Governor Lefroy found *Plantago virginica* near Flatts Village, some eighteen miles from here by road; but it seems now to be about extinct."

INCOMPLETÆ.

NYCTAGINEÆ.

Boerhaavia erecta, Linn.

Boerhaavia erecta, Linn., Sp. Pl., ed. 1, p. 3; Chapm., Fl. Southern U.S., p. 373; Griseb., Fl. Brit. W. Ind., p. 69.

BERMUDAS.—Introduced? Paynter's Vale—*Lefroy;* common—*Reade.*

South Carolina to Florida, Mexico, and Central America; and in the West Indies.

Locally known as "Hogweed."

Mirabilis jalapa, Linn.

Mirabilis jalapa, Linn., Sp. Pl., ed. 1, p. 177; Griseb., Fl. Brit. W. Ind., p. 69.

BERMUDAS.—Introduced. *Lane; Lefroy.*

Mexico and West Indies. Cultivated and commonly naturalised in many other countries.

AMARANTACEÆ.

Amarantus hybridus, Linn.

Amarantus hybridus, Linn., Sp. Pl., ed. 1, p. 990; Chapm., Fl. Southern U.S., p. 380.

BERMUDAS.—Introduced. Paynter's Vale—*Lefroy.*

Virginia to Florida and Mexico.

This is regarded by some botanists as a variety of the widely spread *Amarantus retroflexus*, Linn.

Amarantus spinosus, Linn.

Amarantus spinosus, Linn., Sp. Pl., ed. 1, p. 991; Griseb., Fl. Brit. W. Ind., p. 68; Chapm., Fl. Southern U.S., p. 380.

BERMUDAS.—Introduced. Amongst rubbish—*Lane.*

A very widely spread weed in warm countries.

CHENOPODIACEÆ.

Chenopodium album, Linn.

Chenopodium album, Linn., Sp. Pl., ed. 1, p. 219; Chapm., Fl. Southern U.S., p. 376.

BERMUDAS.—Introduced. David Island—*Lefroy.*

A native of the Old World; and a weed of cultivation in all temperate and sub-tropical countries.

Chenopodium ambrosioides, Linn.

Chenopodium ambrosioides, Linn., Sp. Pl., ed. 1, p. 219; Griseb., Fl. Brit. W. Ind., p. 60, var. *anthelminticum*; Gray, Manual, ed. 5, p. 408; Linn., Sp. Pl., ed. 1, p. 220 (species); Chapm., Fl. Southern U.S., p. 377.

BERMUDAS.—Introduced. A weed in cultivated ground—*Lefroy.*

Throughout Tropical and Sub-tropical America, and naturalised in many other parts of the world.

Atriplex cristata, Humb. et Bonpl.

Atriplex cristata, Humb. et Bonpl. ex Willd., Sp. Pl., iv. p. 959.
Obione cristata, Moq. in DC. Prodr., xiii. 2, p. 110.

BERMUDAS.—Indigenous. Common in salt marshes—*Lefroy.*

Cuba, San Domingo, and Venezuela to Peru.

Salicornia ambigua, Michx.

Salicornia ambigua, Michx., Fl. Bor.-Am., i. p. 2; Griseb., Fl. Brit. W. Ind., p. 60; Chapm., Fl. Southern U.S., p. 378; Gray, Manual, ed. 5 (var. *Salicorniæ fruticosæ*).
Arthrocnemum ambiguum, Moq., Chenop. Enum., p. 112.

BERMUDAS.—Indigenous. Abundant on the coast—*Lane; Rein; Moseley; Lefroy.*

Eastern coast of North America, West Indies and South America, and also in the Old World, if only a variety of *Salicornia fruticosa*.

Boussingaultia baselloides, H. B. K.

Boussingaultia baselloides, H. B. K., Nov. Gen. et. Sp., vii. p. 196, t. 645 bis; DC., Prodr., xiii. 2, p. 228.

BERMUDAS.—Introduced? David Island—*Lefroy.*

Martinique and Mexico southward to Brazil.

POLYGONACEÆ.

Polygonum acre, H. B. K.

Polygonum acre, H. B. K., Nov. Gen. et. Sp., ii. p. 179; Griseb., Fl. Brit. W. Ind., p. 161; Chapm., Fl. Southern U.S., p. 389; Mart., Fl. Bras., xiv. t. 5.

BERMUDAS.—Indigenous. Water-holes and ditches—*Lefroy; Moseley.*

Massachusetts to Buenos Ayres, inhabiting ditches and other wet situations.

Rumex crispus, Linn.

Rumex crispus, Linn., Sp. Pl., ed. 1, p. 335; Chapm., Fl. Southern U.S., p. 385.

BERMUDAS.—Introduced. *Lane; Moseley.*

North temperate regions of the Old World, and naturalised in North America, &c.

Rumex pulcher, Linn.

Rumex pulcher, Linn., Sp. Pl., ed. 1, p. 336; Chapm., Fl. Southern U.S., p. 386.

BERMUDAS.—Introduced. *Moseley.*

North temperate regions of the Old World, and naturalised very widely.

Coccoloba uvifera, Jacq.

Coccoloba uvifera, Jacq., Sel. Stirp. Am., p. 112, t. 73; Griseb., Fl. Brit. W. Ind., p. 161; Chapm., Fl. Southern U.S., p. 391.

BERMUDAS.—Indigenous? Sandhills—*Lane;* common in sandy places near the shore—*Jones; Lefroy;* here and there, but nowhere in large numbers—*Rein.*

Florida, West Indies, and Venezuela to Brazil.

In a list of indigenous and introduced shrubs and trees furnished by the Hon. J. H. Darrell to Sir J. H. Lefroy, this tree is marked as from the West Indies, though no

particulars are given of its introduction into the Bermudas. Among Sir J. H. Lefroy's notes are some dimensions of trees of *Coccoloba uvifera* growing at Ardsheal. One had a trunk six feet four inches in girth. But the writer says, "These may be called upright branches rather than stems, many of them springing from a very broad base or trunk only two or three feet in height, which is supported on a wide mass of thick and knotted roots that are only partially covered by the sandy earth. One of these short trunks measures twenty-one feet ten inches round, and has seven erect stems or branches."

PIPERACEÆ.

Peperomia magnoliæfolia, A. Dietr.

Peperomia magnoliæfolia, A. Dietr., Sp. Pl., i. p. 153; Chapm., Fl. Southern U.S., Suppl., p. 645; DC., Prodr., xvi. 1, p. 427.
Piper magnoliæfolium, Jacq., Ic. Pl. Rar., t. 213.
Peperomia amplexicaulis, Dietr. (varietates) ex Griseb., Fl. Brit. W. Ind., p. 166.

BERMUDAS.—Indigenous. The caves—*Moseley; Lefroy.*

Florida, West Indies, and Mexico.

Grisebach, *loc. cit.*, and C. de Candolle (in DC. Prodr., xvi. 1, pp. 425, 427, et 429), do not agree in their limitations of this species; *Peperomia amplexicaulis* and *Peperomia obtusifolia*, and it is not quite clear which name the Bermudan plant should bear.

EUPHORBIACEÆ.

Euphorbia buxifolia, Lam.

Euphorbia buxifolia, Lam., Encycl. ii. p. 421; Griseb., Fl. Brit. W. Ind., p. 53; Desc., Fl. Ant., vi. p. 418.
Euphorbia glabrata, Swartz, Prodr., p. 76.
Euphorbia littoralis, et *Euphorbia flexuosa*, H. B. K., Nov. Gen. et Sp., ii. pp. 54 et 55; Chapm., Fl. Southern U.S., p. 403.
Tithymalus maritimus barbadensis et bermudensis, Pluk. Alm., p. 371, et Phytogr., t. 229, fig. 7.

BERMUDAS.—Indigenous. St. George—*Holton;* common on sea-shore—*Lefroy; Lane; Jones;* abundant in crevices of rocks—*Reade.* And in Sloane's Herbarium, xcviii. p. 107.

A shrubby maritime species in Florida and Mexico to Venezuela, and throughout the West Indies.

Euphorbia heterophylla, Linn.

Euphorbia heterophylla, Linn., Amœn. Acad., iii. p. 112; Griseb., Fl. Brit. W. Ind., p. 54; DC., Prodr., xvi. 1, p. 72 (varietates).
Euphorbia cyathophora, Murr., Comm. Gœtt., vii. p. 81, t. 1; Jacq., Ic. Pl. Rar., t. 480; Chapm., Fl. Southern U.S., p. 402.

BERMUDAS.—Introduced? Common—*Rein; Moseley; Lefroy; Reade.*

Eastern North America, from Illinois southward, and through the West Indies and Mexico to Peru and Brazil.

Locally known as "Joseph's Coat."

Euphorbia hypericifolia, Linn.

Euphorbia hypericifolia, Linn., Hort. Cliff., p. 198; DC., Prodr., xv. 2, p. 23; Griseb., Fl. Brit. W. Ind., p. 54; Chapm., Fl. Southern U.S., p. 403; Hook, Exot. Fl., t. 36.

BERMUDAS.—Introduced? Common—*Moseley; Lefroy.*

Eastern States of North America, West Indies, Mexico, and South America.

Euphorbia maculata, Linn.

Euphorbia maculata, Linn., Sp. Pl., ed. 1, p. 455, nec Linn. Mant., ex Boiss in DC. Prodr., xv. 2, p. 46; Jacq., Hort. Vindob., t. 186; Griseb., Fl. Brit. W. Ind., p. 53; Chapm., Fl. Southern U.S., p. 403.

BERMUDAS.—Introduced. Common—*Lefroy.*

Canada to Florida, Mexico, and the West Indies.

Euphorbia peplus, Linn.

Euphorbia peplus, Linn., Sp. Pl., ed. 1, p. 456; Griseb., Fl. Brit. W. Ind., p. 54; Gray, Manual, ed. 5, p. 435.

BERMUDAS.—Introduced. Common—*Holton; Lane; Rein; Moseley; Lefroy.*

North temperate regions of the Old World, and widely colonised.

Euphorbia prostrata, Ait.

Euphorbia prostrata, Ait., Hort. Kew., ed. 1, ii. p. 139; Griseb., Fl. Brit. W. Ind., p. 53; Chapm., Fl. Southern U.S., Suppl., p. 647.

BERMUDAS.—Introduced? Common—*Lefroy; Reade.*

Louisiana and Texas southward to Peru and Brazil; also in Tropical Africa, and naturalised in Sicily and elsewhere.

Phyllanthus niruri, Linn.

Phyllanthus niruri, Linn., Sp. Pl., ed. 1, p. 981; Griseb., Fl. Brit. W. Ind., p. 34; Chapm., Fl. Southern U.S., p. 410.

BERMUDAS.—Introduced. A weed in cultivated ground—*Lefroy.*

Generally diffused in warm countries.

Jatropha curcas, Linn.

Jatropha curcas, Linn., Sp. Pl., ed. 1, p. 1006; Griseb., Fl. Brit. W. Ind., p. 36; Desc., Fl. Ant., ii. p. 141.

BERMUDAS.—Introduced? Paynter's Vale Cave—*Lefroy.*

West Indies and Tropical America, and naturalised in most other tropical countries.

Croton maritimus, Walt.

Croton maritimus, Walt., Fl. Carol., p. 239; Chapm., Fl. Southern U.S., p. 407; DC., Prodr., xv. 2, p. 689.

BERMUDAS.—Indigenous. Paget sandhills and other places on the coast, common—*Lefroy; Reade.*

North Carolina to the West Indies, Mexico, and Venezuela.

Mercurialis annua, Linn.

Mercurialis annua, Linn., Sp. Pl., ed. 1, p. 1035; DC., Prodr., xv. 2, p. 797; Chapm., Fl. Southern U.S., Suppl., p. 647.

BERMUDAS.—Introduced. A weed in cultivated ground—*Lefroy; Moseley.*

North temperate regions of the Old World, and naturalised in many other parts.

Ricinus communis, Linn.

Ricinus communis, Linn., Sp. Pl., ed. 1, p. 1007, *pro parte*; DC., Prodr., xv. 2, p. 1017; Griseb., Fl. Brit. W. Ind., p. 37; Chapm., Fl. Southern U.S., p. 409.

BERMUDAS.—Introduced. *Rein; Lefroy.*

Tropical Asia, and naturalised in all warm countries.

URTICACEÆ.

Celtis occidentalis, Linn.

Celtis occidentalis, Linn., Sp. Pl., ed. 1, p. 1044; Chapm., Fl. Southern U.S., p. 417.

BERMUDAS.—Indigenous? The caves—*Lefroy;* near Walsingham—*Reade.*

North Carolina to Florida.

[*Morus rubra*, Linn., and perhaps some other species of the genus, has been cultivated, and exists in a half-wild state.]

Ficus carica, Linn.

Ficus carica, Linn., Sp. Pl., ed. 1, p. 1059; Chapm., Fl. Southern U.S., p. 415.

BERMUDAS.—Introduced. Wild in some places—*Lefroy.*

Imported from Europe early in the seventeenth century, and extensively planted. It probably exists in the islands only as the remains of cultivation, as seedling plants are unknown, apparently, in countries where the Caprifig does not grow. There appears to be no evidence that Sir George Somers met with wild figs when he first landed in the islands. Yet Mr Darrell seems to have been of this opinion, judging from the following communication to Sir J. H. Lefroy:—"I always believed that these *indigenous* fig-trees were left here by the Spaniards who discovered Bermuda before Sir George Somers saw it; and who, no doubt, left here the *indigenous* black hogs Sir George found here."

Urtica chamædryoides, Pursh.

Urtica chamædryoides, Pursh., Fl. Am. Sept., i. p. 113; DC., Prodr., xvi. 1, p. 42 (varietates); Chapm., Fl. Southern U.S., p. 412.

BERMUDAS.—Indigenous? Without locality—*Lefroy*.

Georgia; Texas; Mexico.

Urtica dioica, Linn.

Urtica dioica, Linn., Sp. Pl., ed. 1, p. 984; Chapm., Fl. Southern U.S., p. 412; Gray, Manual, ed. 5, p. 444.

BERMUDAS.—Introduced. *Rein; Reade.*

A domestic plant of the Old World, now wild in most temperate and sub-tropical regions.

Urtica urens, Linn.

Urtica urens, Linn., Sp. Pl., ed. 1, p. 984; Chapm., Fl. Southern U.S., p. 412.

BERMUDAS.—Introduced. *Rein; Moseley.*

Old World, and now nearly as widely spread as the last.

Bœhmeria cylindrica, Willd.

Bœhmeria cylindrica, Willd., Sp. Pl., iv. p. 340; Griseb., Fl. Brit. W. Ind., p. 160; Chapm., Fl. Southern U.S., p. 414.

BERMUDAS.—Indigenous. Marshes, common—*Moseley; Lefroy.*

Canada to Brazil and Uruguay; exceedingly common in many parts in swampy and shady situations.

Parietaria officinalis, Linn.

Parietaria officinalis, Linn., Sp. Pl., ed. 1, p. 1052; DC., Prodr., xvi. 1, p. 235[42].

BERMUDAS.—Introduced. Common—*Moseley; Reade.*

Introduced from Europe.

Parietaria debilis, Forst.

Parietaria debilis, Forst., Fl. Ins. Austr. Prodr., p. 73; Chapm., Fl. Southern U.S., p. 414.

BERMUDAS.—Indigenous. Walls in St. George's—*Lefroy;* without locality—*Rein.*

Very widely diffused in temperate and warm regions.

Parietaria pennsylvanica, Mühlenb.

Parietaria pennsylvanica, Mühlenb., Cat. Pl. Am. ex Wedd. in DC. Prodr., xvi. 1, p. 235[47]; Chapm., Fl. Southern U.S., p. 413.

BERMUDAS.—Indigenous. North shore—*Lefroy;* without locality—*Moseley.*

Vermont to Wisconsin, and southward to Florida and Mexico.

Pilea microphylla, Liebm.

Pilea microphylla, Liebm. in K. Dansk. Vidensk. Selsk. Skrift., ser. 5, ii. p. 296 (reprint, p. 12).
Pilea muscosa et *Pilea herniarioides*, Lindl., Collect., t. 4; Chapm., Fl. Southern U.S., p. 413; Griseb., Fl. Brit. W. Ind., p. 155.

BERMUDAS.—Indigenous? *Moseley; Lefroy.*

Generally diffused in Tropical and Sub-tropical America.

MYRICACEÆ.

Myrica cerifera, Linn.

Myrica cerifera, Linn., Sp. Pl., ed. 2, p. 1453; Chapm., Fl., Southern U.S., p. 426.
Myrica punctata, Griseb., Pl. Wright., p. 177!
Myrtus brabantica, Pluk., Alm., p. 250 bis (260), et Phytogr., t. 48, fig. 8 et 9.

BERMUDAS.—Indigenous. Abundant in the marshes—*Lane; Rein; Moseley; Lefroy.* And in Sloane's Herbarium, ci. p. 49.

A sea-shore and swamp shrub, ranging from Massachusetts to Florida, the Bahamas, and Cuba.

Rein identified his specimens of *Myrica* with *Myrica punctata*, Griseb., which, judging from the specimens so named in Kew Herbarium, is not specifically different from the common *Myrica cerifera*, Linn.

CERATOPHYLLEÆ.

Ceratophyllum demersum, Linn.

Ceratophyllum demersum, Linn., Sp. Pl., ed. 1, p. 992; Griseb., Fl. Brit. W. Ind., p. 12; Chapm., Fl. Southern U.S., p. 398.

BERMUDAS.—Indigenous. Without locality or other information—*Rein.*

Nearly all over the world, except the colder regions.

This and the other true fresh-water aquatic plants (*Lemna minor* and *Lemna trisulca*) must be exceedingly rare and local, for there is scarcely any fresh water in the islands, except in the rain-water tanks.

MONOCOTYLEDONES.

ORCHIDEÆ.

Spiranthes tortilis, Rich.

Spiranthes tortilis, Rich., Orch. Annot., p. 37; Griseb., Fl. Brit. W. Ind., p. 640; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.

BERMUDAS.—Indigenous. Pembroke marshes—*Lefroy;* without locality—*Moseley;* only two plants were seen growing in an open place amidst *Stenotaphrum americanum*—*Rein;* marshes—*Reade.*

Antigua, Jamaica.

This is the plant referred to in the Journal of the Linnean Society (xiv. p. 319) as *Spiranthes brevifolia*, Chapm., which it is not, as we have since been able to prove by comparison with an authentically named specimen recently acquired for the Kew Herbarium. Mr Moseley informs us that he saw a considerable number of plants.

IRIDEÆ.

Sisyrinchium bermudiana, Linn.

Sisyrinchium bermudiana, Linn., Sp. Pl., ed. 1, p. 954, *pro parte* (*quoad β tantum*); Hemsl. in Journ. Bot. 1884, p. 108.

Sisyrinchium bermudiense, floribus parvis ex cæruleo et aureo mixtis. Iris phalangoides quorundam, Pluk., Alm., p. 348; Phytogr., t. 61, fig. 2.

Bermudiana iridis folio, fibrosâ radice, Tournef., Inst. Rei Herb., p. 388, t. 108; Dill., Hort. Elth., p. 48, t. 41, fig. 48.

Sisyrinchium iridioides, Curtis, Bot. Mag., t. 94.

Sisyrinchium bermudiana, Mill., Abridg. Dict., ed. 6; Lamark, Encycl. Méthod. Bot., i. p. 408; Redouté, Lil., t. 149.

Sisyrinchium bermudiana, var. 1, Baker in Journ. Linn. Soc. Lond., xvi. p. 117.

Bermudas.—Endemic. Spread all over the islands—*Lane; Rein; Lefroy; Moseley.*

On first seeing the Bermudan specimens of *Sisyrinchium* collected by Sir J. H. Lefroy and Mr Moseley, we suspected that they were specifically different from the plant commonly known as *Sisyrinchium bermudiana*, and after comparing them with numerous specimens from other countries, we were convinced that the Bermudan specimens belonged to a distinct species. Referring to the literature of the subject, this view was found to be supported by all the early authors who had actually seen the plant. Plukenet originally published it, and distinguished it from the common form in eastern North America, giving a figure of each. Dillenius (Hortus Elthamensis), who had opportunities of seeing them alive, followed Plukenet in keeping them distinct. Linnæus, who, it may be assumed, did not see the Bermudan plant, as there is no specimen in his herbarium, united the two under the name *Sisyrinchium bermudiana*. Miller, who knew them in a living state, seems to have been the first (1771) to restore the two forms to specific rank; and he was followed by Lamarck, who also knew them alive, and who more fully described the differences between the two. In 1789 Curtis figured (in the Botanical Magazine) the Bermudan species, concerning which he wrote thus:—"On comparing the present plant with the *Bermudiana graminea flore minore cæruleo* of Dillenius, both of which I have growing, and now in pots before me, the difference appears so striking that I am induced with him and Miller to consider them as distinct species; especially as, on a close examination, there appear characters sufficient to justify me in the opinion, which characters are not altered by culture." Unfortunately, Curtis gave it the new specific name *iridioides*. He was led to do this in consequence of Linnæus having made the Bermudan form the var. β of his composite or aggregate species; but he afterwards, when figuring the other form, *Sisyrin-*

chium gramineum (Bot. Mag., t. 464), recognised the impropriety of the step, and acknowledged that it ought to bear the original name of *bermudiana*.

De Candolle (in Redouté's Liliacées) also insists upon the specific rank of the Bermudan plant, which, unlike the ordinary *Sisyrinchium gramineum*, *Sisyrinchium anceps*, and other forms with which it has been associated, is not hardy in England, but requires the protection of a greenhouse. Mr Baker, in his recent Systema Iridacearum, placed it as a variety of a species embracing the forms just named, but he now agrees that it is entitled to stand as a distinct species.

Its more striking characters are: its relatively large size, broad equitant leaves, short, broad, nearly equal bracts of the spathe, and its broad obovate mucronate perianth lobes.

Sisyrinchium bermudiana seems to be no longer in English gardens, and it is not the species naturalised or wild in Ireland, and naturalised in the Mauritius, Australia, and New Zealand. In Bishop Goodenough's Herbarium, now at Kew, there is a cultivated specimen of the Bermudan plant.

AMARYLLIDEÆ.

Narcissus jonquilla, Linn.

Narcissus jonquilla, Linn., Sp. Pl., ed. 1, p. 290; Bot. Mag., t. 15.

BERMUDAS.—Introduced. Escaped from gardens—*Lefroy*.

Europe.

Agave americana, Linn.

Agave americana, Linn., Sp. Pl., ed. 1, p. 323; Griseb., Fl. Brit. W. Ind., p. 582.

BERMUDAS.—Introduced. Used for hedges, and also occurring in a more or less wild state—*Jones; Rein; Lefroy*.

Mexico and the West Indies.

LILIACEÆ.

Aloe vera, Linn.

Aloe vera, Linn., Sp. Pl., ed. 1, p. 320; Baker in Journ. Linn. Soc., xviii. p. 176.
Aloe vulgaris, Lam., Encycl., i. p. 86; Griseb., Fl. Brit. W. Ind., p. 582.
Aloe barbadensis, Mill., Abridg. Dict., ed. 6, n. 2.

BERMUDAS.—Introduced. Rocky places—*Rein*; common—*Moseley; Lefroy*; not very common in a wild state, the flowers being only occasionally seen on the sunny slopes of the southern shore—*Jones*.

Mediterranean region. Introduced into the West Indies upwards of three centuries ago, and imported from the Barbadoes into English gardens in 1596, hence Miller's name. Mr Darrell gives the following particulars of its introduction into the Bermudas:—

"During the administration of Governors Browne and Hamilton (1785–1789), with the view of encouraging agriculture, the Colonial Legislature passed laws for granting bounties and advancing loans to landholders cultivating cotton and aloes. The latter occupation, as I have heard in my youth, was soon discontinued, by reason of several women having died who were employed in collecting the aloe juice from the leaves in the hot sun in summer time. Within my recollection there were patches remaining of these abandoned aloe farms, of half an acre or more, in various places near Devonshire Church and near the Salt Kettle."

Yucca aloifolia, Linn.

Yucca aloifolia, Linn., Sp. Pl., ed. 1, p. 319; Griseb., Fl. Brit. W. Ind., p. 582; Chapm., Fl. Southern U.S., p. 485.

BERMUDAS.—Introduced. *Rein.*

North Carolina to Florida, the West Indies, and Mexico.

Yucca gloriosa, Linn.

Yucca gloriosa, Linn., Sp. Pl., ed. 1, p. 319; Chapm., Fl. Southern U.S., p. 485.

BERMUDAS.—Introduced. Drifting sands of Port Royal—*Jones.*

North Carolina to Florida.

This species is not included in any other collection or list, and needs verification.

COMMELINACEÆ.

Commelina nudiflora, Linn.

Commelina nudiflora, Linn., Sp. Pl., ed. 1, p. 41; C. B. Clarke in DC. Monogr. Phanerog., iii. p. 144.
Commelina cayennensis, Rich. ex Griseb., Fl. Brit. W. Ind., p. 524.
Commelina agraria, Kth., Enum., iv. p. 38.
Commelina communis, Linn. ? Chapm., Fl. Southern U.S., p. 497.

BERMUDAS.—Indigenous ? The commonest spring flower—*Lefroy; Moseley; Rein; Reade.*

Generally diffused in warm countries.

The *Commelina communis* of Lane's list is doubtless the same species.

JUNCACEÆ.

Juncus tenuis, Willd.

Juncus tenuis, Willd., Sp. Pl., ii. p. 214; Griseb., Fl. Brit. W. Ind., p. 581; Chapm., Fl. Southern U.S., p. 493.

BERMUDAS.—Indigenous. Without locality—*Rein.*

Widely spread in North America, and extending, according to Grisebach, southward through the West Indies to Uruguay. It is also European.

Juncus marginatus, Rostk.

Juncus marginatus, Rostk., Monogr. Junc., p. 28, t. 2, fig. 2; Chapm., Fl. Southern U.S., p. 495.

BERMUDAS.—Indigenous. Marshes—*Moseley; Lefroy.*

New Jersey and Illinois southward to Florida and Texas.

PALMEÆ.

Sabal blackburniana, Glazebrook. (Plates VI., VII., VIII., IX.)

Sabal blackburniana, Glazebrook in Loudon's Gardeners' Magazine, 1829, v. p. 54, cum fig. xylogr.; Rœm. et Schult. Syst. Veg., vii. p. 1488.

Sabal palmetto, Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am. M., 1873, p. 150, et auct. plur. non Rœm. et Schult.

Chamærops excelsa et *Chamærops palmetto*, Lefroy's list, Berm. Pl.

Chamærops glabra, Jones, Naturalist in Bermuda, p. 136.

Sabal umbraculifera, Mart., Hist. Palm., i. t. T., fig. 5, t. Y., figs. 5, 6, 7, t. Z., i., figs. 1–56, et iii., p. 245, t. 130? non Griseb., Fl. Brit. W. Ind. p. 514.[1]

Corypha umbraculifera, Jacq., Fragm. Bot., p. 12, non Linn.

BERMUDAS.—Indigenous and endemic? Common throughout the islands.

Until Sir Joseph Hooker took the palms in hand to elaborate them for the Genera Plantarum, it seems to have been generally supposed that *Sabal palmetto* inhabited the Bermudas as well as south-eastern North America: but among the imperfect material in British herbaria from the islands there was nothing belonging to that species; and what there was, though insufficient for identification, indicated a different species. The descriptions, too, in the earlier writers of the fruit of the Bermudan palm proved that the common one could not be *Sabal palmetto*, for the fruits were much larger. At first it seemed doubtful whether there was not more than one species indigenous in the Bermudas; but, thanks to the kindness of several gentlemen resident in the islands, we have been able to examine ample material, and are now in a position, we believe, to assert that there is only one. It is true that Mr Charles C. Keane sent sketches and measurements of what he thought were distinct species, and which we, at first, believed might be such, but finally decided were from trees of different ages. This view is confirmed by the fact that flowers and fruit of only one species have been received, and young and old plants of the same species under cultivation exhibit the diversities regarded as specific by Mr Keane. Nevertheless, some portions of Mr Keane's letters to Sir Joseph Hooker relating to these different states appear to be worth putting on record here.

"I wrote you some few days since enclosing a sketch of what seems to me to be two different specimens [species] of the palmetto. I have this day had packed and shall send

[1] There is some doubt as to the date of the publication of Martius's name, though the description appeared about or after 1836. Moreover, there is no ground for retaining the name *umbraculifera*, because Jacquin gave it to a young plant believing it was the Asiatic *Corypha umbraculifera*. Grisebach specially mentions the palm cultivated as not being the same as the one he describes as *Sabal umbraculifera*.

you some leaves of the plants which I sketched, and also a couple of small leaves which I procured yesterday. I found them on the top of a high hill, and although there is not much apparent difference in the leaf, yet it is different in the manner of its growth, as it springs from the ground without any apparent stem. The people in the neighbourhood have never seen it bear flowers or fruit. It may be the dwarf palmetto[1] you mention. And now to answer your inquiries as well as I am able.

"1. The height of the common palmetto varies from five to twenty feet in good ground; in the marshes it grows from thirty-five to forty feet. Its circumference varies with its locality. In the good soil it attains from forty to fifty inches; in the marshes sixteen to twenty inches.

"2. Breadth of leaf, six to eight feet.

"3. Length of leaf-stalk, three to seven feet and a half.

"4. It is wild in many parts of the islands and on the islets where there are no inhabitants, and would appear to have sprung up spontaneously.

"5. This is the only palmetto which bears a fruit. We know of but one sort, the small black berry, of which Dr Hinson will send you samples when they are ripe. There can be, I think, no doubt that it is indigenous. The fact that it was known to the earliest settlers, and its leaves used for covering houses, churches, &c., and that it had a commercial value long before the establishment of any communication with the West Indies, would, I think, be sufficient proof.

"I have already mentioned the small kind I found yesterday. It was growing in a poor soil on the top, or nearly so, of a high hill. I noticed a few more scattered about, quite stunted or dwarf."

Mr Oswald A. Reade sent the following reply to Sir Joseph Hooker's inquiries concerning the palm or palms indigenous in the islands:—

"The so-called dwarf palmetto (*Chamærops glabra* of General Lefroy's list) grows on dry hills and in very shallow soil. It is plentiful to the left of the entrance to Hamilton Harbour. I have examined it carefully, comparing measurements of leaves, segments, &c., but I could detect no specific difference between this and the common palmetto. In many individuals the stem is wanting; in others a small stem has apparently been the result of many years' growth, evidenced by the extreme roughness of trunk, hourglass contractions, and decay; while near cultivated ground it gradually merges imperceptibly into the larger palm. On the shallow, rocky soil the leaves assume a yellowish hue, and in none of the dwarf specimens could I find evidence of a spadix, even on those whose decayed but short trunks gave signs of considerable age. The hourglass contractions mentioned above are very curious; in one which I measured, the circumference at one foot from the ground

[1] Sir J. H. Lefroy and others distinguished a dwarf palmetto, differing from the ordinary one in having no trunk. This is no doubt the *Sabal blackburniana* in a young state. Many palms are years before they begin to form a trunk.

was thirty inches; at two feet, eight inches—eight inches only—and at three feet, twenty-five inches. In other stunted individuals the stem appears conical, and sometimes as a bulbous expansion close to the ground."

Mr W. H. Gosling, who forwarded flowers of the *Sabal blackburniana* to Kew, through Sir J. H. Lefroy, states, in the letter accompanying them, that there is certainly only one species of palm indigenous in the Bermudas.

Dr H. J. Hinson, who sent good specimens of flower, fruit, and leaves to Kew, was also of opinion that only one species grew wild in the islands; in confirmation of which he sent a leaf from a young plant raised from a seed borne by an old one, of which he sent the leaves, flowers, and fruit. This leaf from the young plant had a long slender petiole. The blade of the largest leaf sent from the old tree was eight feet across, and borne on a petiole eight feet long; and the inflorescence was five feet six inches long.

But the most remarkable fact in connection with the Bermuda palm remains to be explained: the wild specimens sent to Kew proved to belong to a species of palm of which there is evidence that it has been cultivated in England for at least 150 years, and of which, besides numerous small ones, there is a magnificent example in the palm-house at Kew, which flowers and bears fruit continuously. The origin of the cultivated palm was involved in obscurity. In 1737, a small plant of it was presented by Lord Petre to the grandfather of the Mr Blackburn after whom it was named in the periodical cited above, where there are figures and a description of it. The earliest record of its flowering in this country that we have found is 1818. Mr John Smith, ex-curator of the Royal Gardens, Kew, to whom we are indebted for so much of the history of the cultivated palm as was known, informs us that Martius saw the palm at Kew and named it *Sabal umbraculifera*, and Martius himself cites *Sabal blackburniana* as a synonym of *Sabal umbraculifera*. Whether it be really so or not, the former name, as the first under the accepted genus, is the one that should be retained. It is not, however, quite certain that it is the same. The only West Indian specimens of the Bermuda palm in the Kew Herbarium were sent by Mr Prestoe, of the Trinidad Botanic Garden, with a note to the effect that they were from cultivated trees said to be of Bermudan origin; and it is certain that the palm described by Grisebach under the name of *Sabal umbraculifera* in the Flora of the British West Indies is not the same. In order that the species may be better understood, four plates are here devoted to the illustration of the Bermuda palm. It should be mentioned that Mr Prestoe states in a subsequent letter (1883) to Sir Joseph Hooker that if he wrote Bermuda it must have been, he thinks, a slip of the pen—Bahamas being intended; adding that he had never sent any specimens of *Sabal umbraculifera*. But as the specimens were sent fifteen years before, Mr Prestoe may very well have forgotten the circumstance. They are the only specimens of the Bermuda palm in Kew Herbarium not from the Bermudas, if we except those cultivated at Kew. Mr Prestoe's memorandum with the specimen runs thus:—"Probably same as *Sabal umbraculifera* of Kew. Specimens collected

in Mr Latham's garden; introduced from Bermuda, where it is said to be indigenous, and called the Great Palmetto."

The confusion regarding this palm is almost endless. Martius states that Jacquin the elder first introduced it into European gardens, whereas Jacquin himself says that the only plant possessed by the Schœnbrunn garden was obtained from Holland. Moreover, he was under the impression that it was the true *Corypha umbraculifera*, and gives Malabar as the native country. Martius quotes Hayti and Cuba as the home of the *Sabal umbraculifera*, where he says it was frequent, and the leaves were used by the natives for roofing; yet we have seen no specimens of it from either of those islands. The figures and description in Martius's book seem to have been made from the Bermuda palm.

The present dimensions of the large specimen in the palm-house at Kew are:—Height of naked trunk, twenty feet; height of head from the base of the lower leaves to the tips of the uppermost, twenty feet; spread of leaves, twenty-five feet; circumference of trunk one foot from the ground, four feet.

TYPHACEÆ.

Typha angustifolia, Linn., var. *domingensis*, Pers.

Typha angustifolia, Linn., Sp. Pl., ed. 1, p. 971, var. *domingensis*, Pers., Ench., ii. p. 532 (species); Griseb., Fl. Brit. W. Ind., p. 512.

Bermudas.—Indigenous. Banks of lagoons, common—*Rein; Moseley; Lefroy.*

The species is generally diffused in the temperate and tropical zones, and the variety, according to Grisebach, ranges from Texas to Brazil.

LEMNACEÆ.

Lemna minor, Linn.

Lemna minor, Linn., Sp. Pl., ed. 1, p. 970; Griseb., Fl. Brit. W. Ind., p. 512; Chapm., Fl. Southern U.S., p. 442; Hegelm., Lemn., p. 142, tt. 9, 10.

Bermudas.—Indigenous. *Rein.*

The most widely diffused species of this cosmopolitan genus.

Lemna trisulca, Linn.

Lemna trisulca, Linn., Sp. Pl., ed. 1, p. 970; Griseb., Fl. Brit. W. Ind., p. 512; Hegelm., Lemn., p. 134, tt. 5, 6.

Bermudas.—Indigenous. *Rein; Lefroy.*

Europe, Asia, North America, and Australia.

NAIADACEÆ.

Ruppia maritima, Linn.

Ruppia maritima, Linn., Sp. Pl., ed. 1, p. 127; Griseb., Fl. Brit. W. Ind., p. 506; Chapm., Fl. Southern U.S., p. 445.

Bermudas.—Indigenous. Lagoons—*Rein; Moseley.*

All round the temperate and sub-tropical zones of both hemispheres.

Zostera marina, Linn.

Zostera marina, Linn., Sp. Pl., ed. 1, p. 968; Chapm., Fl. Southern U.S., p. 445.

Bermudas.—Indigenous. *Rein.*

On most temperate and sub-tropical coasts.

CYPERACEÆ.

Cyperus odoratus, Vahl.

Cyperus odoratus, Vahl., Enum. Pl., ii. p. 356; Boeckl. in Linnæa, xxxvi. p. 407, non Linn. ex C. B. Clarke, MSS.

Cyperus odoratus, Linn. in Griseb., Fl. Brit. W. Ind., p. 565.

Bermudas.—Indigenous. Marshes—*Moseley; Lefroy.*

West Indies and South America.

It is uncertain what specific name this *Cyperus* should bear, and until all the species have been properly defined and their synonymy reduced, many of the names in use can only be regarded as provisional. The Bermudan species has been referred to *Cyperus phymatodes*, Mühl., to *Cyperus esculentus*, Linn., and to *Cyperus flexuosus*, Vahl.

Cyperus rotundus, Linn.

Cyperus rotundus, Linn., Sp. Pl., ed. 1, p. 45; Griseb., Fl. Brit. W. Ind., p. 546.

Bermudas.—Indigenous. *Lefroy; Reade.*

A very widely-spread species in warm countries.

Sir J. H. Lefroy enumerates it in his list as having been identified by General Munro and Dr Asa Gray, but we have seen no Bermudan specimens.

Kyllinga monocephala, Rottb.

Kyllinga monocephala, Rottb., Ic. et Descr. Pl., p. 13, t. 4, fig. 4; Griseb., Fl. Brit. W. Ind., p. 568; Chapm., Fl. Southern U.S., p. 513.

Bermudas.—Indigenous. Pembroke Marsh—*Lefroy;* marshes—*Reade.*

Georgia and Mexico to Brazil, and in Tropical Asia, Africa, and Australia.

Heleocharis capitata, R. Br.

Heleocharis capitata, R. Br., Prodr. Fl. N. Holl., p. 225; Chapm., Fl. Southern U.S., p. 518 (*Eleocharis*).
Scirpus capitatus, Willd., Sp. Pl., i. p. 294; Griseb., Fl. Brit. W. Ind., p. 570.

BERMUDAS.—Indigenous. Marshes—*Moseley*.

Tropical and Sub-tropical America, Asia, Africa, and Australia.

Heleocharis melanocarpa, Torr.

Heleocharis melanocarpa, Torr. in Ann. Lyc. Nat. Hist. N. York, iii. p. 311; Chapm., Fl. Southern U.S., p. 516 (*Eleocharis*).

BERMUDAS.—Indigenous. *Rein*.

North America, on the coast from Massachusetts to Florida.

Heleocharis plantaginea, R. Br.

Heleocharis plantaginea, R. Br., Prodr. Fl. N. Holl., p. 224, *in nota* (*Eleocharis*).
Scirpus plantagineus, Linn. ex Griseb., Fl. Brit. W. Ind., p. 571.
Eleocharis equisetoides, Torr. in Ann. Lyc. Nat. Hist. N. York, iii. p. 296; Chapm., Fl. Southern U.S., p. 514.

BERMUDAS.—Indigenous. Marshes—*Lefroy*.

Florida and Louisiana to Brazil.

Dichromena leucocephala, Michx.

Dichromena leucocephala, Michx., Fl. Bor.-Am., i. p. 37; Chapm., Fl. Southern U.S., p. 530; Gray, Manual, ed. 5, p. 567.
Rhynchospora stellata, Griseb., Fl. Brit. W. Ind., p. 576.

BERMUDAS.—Indigenous. Marshes, &c.—*Moseley; Lefroy; Rein; Reade*.

New Jersey to Florida and the West Indies.

Dichromena pura, Nees.

Dichromena pura, Nees in Linnæa, ix. p. 291; Kunth, Enum., ii. p. 283 (*nomen tantum*).
Rhynchospora pura, Griseb., Fl. Brit. W. Ind., p. 577.

BERMUDAS.—Indigenous. *Rein*.

There are no Bermudan specimens of this species in the Kew Herbarium.

West Indies, Venezuela, and Guiana.

Scirpus lacustris, Linn.

Scirpus lacustris, Linn., Sp. Pl., ed. 1, p. 48; Chapm., Fl. Southern U.S., p. 520; Boeckl. in Linnæa, xxxvi. p. 712.
Scirpus validus, Vahl, Enum., ii. p. 268; Griseb., Fl. Brit. W. Ind., p. 571; Gray, Manual, ed. 5, p. 562.

BERMUDAS.—Indigenous. Salt marshes—*Moseley; Reade*.

Generally diffused in temperate and sub-tropical countries.

Rhynchospora florida, Dietr.

Rhynchospora florida, Dietr., Sp. Pl., ii. p. 71 ; Griseb., Fl. Brit. W. Ind., p. 575.

BERMUDAS.—Indigenous. Without locality or other memorandum—*Lefroy*.

West Indies, Venezuela, Guiana.

We have seen no specimen of this species from the Bermudas, though, according to Lefroy's list, his plant was determined at Kew. It is possible that the sheet was out for getting other specimens attached to it.

Rhynchospora stipitata, Chapm. (Plate X.)

Rhynchospora stipitata, Chapm., Fl. Southern U.S. Suppl., p. 660.

BERMUDAS.—Indigenous. Without special locality, though doubtless from the marshes —*Moseley ; Lefroy*.

The only other locality known for this plant is in swamps near Mosquito Inlet, Florida.

Rhynchospora, sp. n. ?

Rhynchospora, sp. n. ?

BERMUDAS.—Indigenous. Marshes—*Moseley*.

The specimens are unlike anything we find in herbaria, but they are too young for description.

Rhynchospora, sp.

Rhynchospora, sp.

BERMUDAS.—Indigenous. Marshes—*Moseley*.

This also is a distinct species ; but the flowers are all infested with smut and their structure destroyed.

Cladium mariscus, R. Br.

Cladium mariscus, R. Br., Prodr. Fl. N. Holl., p. 236 ; Boeckl. in Linnæa, xxxviii., p. 232.
Cladium occidentale, Schrad., Fl. Germ. 1, p. 76 ; Griseb., Fl. Brit. W. Ind., p. 573.
Schœnus cladium, Swartz, Fl. Ind. Occ., i. p. 87.

BERMUDAS.—Indigenous. Pembroke Marsh—*Lefroy ;* very robust and common in the peat marshes—*Moseley ;* without locality—*Rein*.

Widely dispersed in tropical and temperate regions, including North America, if *Cladium effusum*, Torrey, be the same species.

Carex bermudiana, Hemsl.

Carex bermudiana, Hemsl., n. sp.

Herba gracilis, glabra, ultra pedalis. *Culmus* 4–6 spicatus. *Folia* circiter 2 lineas lata, vix scabrida. *Bractea* infima deest, proxima superior filiformis, culmum paulo

superans. *Spicæ* sessiles vel subsessiles, cylindricæ, 2 vel 3 inferiores omnino fœmineæ, intermedia basi fœminea apice mascula, 2 superiores masculæ. *Glumæ* ovatæ, breviter aristatæ, punctatæ, vix hispidulæ. *Perigynium* longiuscule acuminatum, bifidum, costatum, punctatum, undique fere glabrum. *Styli* 3. *Nux* breviter stipitata, subtrigona, lævis, glabra.—Gram. Cyp. Bermud. tenue spicatum. A Bermud. a D. Dickinson. Herb. Sloan., xxxii. p. 83.—Journ. Bot., 1883, p. 257, t. 239, fig. 2.

BERMUDAS.—Endemic.

Only known from the one specimen in the Sloane Collection in the British Natural History Museum.

It is closely allied to the endemic St Helena *Carex prælata*, Boott, but it is much slenderer, and probably not more than half as tall. All the spikelets are sessile or subsessile, and the bracts are narrower; and the glumes and utricles are dotted as in *Carex æquabilis*, another species endemic in St Helena.

GRAMINEÆ.

Paspalum distichum, Linn.

Paspalum distichum, Linn., Amœn. Acad., v. p. 391; Griseb., Fl. Brit. W. Ind., p. 541; Chapm., Fl. Southern U.S., p. 570.
Paspalum littorale, R. Br., Prodr. N. Holl., p. 188; Trin., Spec. Gram., i. t. 112.

BERMUDAS.—Indigenous. In swamps—*Moseley; Munro; Grisebach; Reade.*

Very widely spread in tropical and sub-tropical regions, both in the New and the Old World.

Paspalum filiforme, Swartz.

Paspalum filiforme, Swartz, Fl. Ind. Occ., i. p. 136; Griseb., Fl. Brit. W. Ind., p. 541; Chapm., Fl. Southern U.S., p. 572.

BERMUDAS.—Indigenous? *Lefroy; Munro.* Locally known as "Wire-grass."

Southern States of North America; West Indies.

Paspalum setaceum, Michx.

Paspalum setaceum, Michx., Fl. Bor.-Am., i. p. 43; Gray, Manual, ed. 5, p. 645.
Paspalum debile et *Paspalum ciliatifolium*, Michx. l. c., p. 44; Chapm., Fl. Southern U.S., p. 571.

BERMUDAS.—Indigenous? Without locality—*Lefroy; Reade.*

A North American grass, ranging from Massachusetts to Florida.

Panicum brevifolium, Linn.

Panicum brevifolium, Linn., Sp. Pl., ed. 1, p. 59; Griseb., Fl. Brit. W. Ind., p. 552.

BERMUDAS.—Introduced? *Rein.*

West Indies.

Panicum capillare, Linn.

Panicum capillare, Linn., Sp. Pl., ed. 1, p. 58; Chapm., Fl. Southern U.S., p. 574; Gray, Manual, ed. 5, p. 647.

BERMUDAS.—Introduced. *Rein.*

Eastern North America, growing in sandy soil and on the coast, from New Jersey southward.

Panicum paspaloides, Pers.

Panicum paspaloides, Pers., Ench., i. p. 81; Griseb., Fl. Brit. W. Ind., p. 545; Kunth, Enum., i. 1, p. 77.

BERMUDAS.—Introduced. *Moseley.*

Widely distributed in warm countries.

Panicum horizontalis, Mey.

Panicum horizontalis, Mey., Esseq., p. 54; Kunth, Enum., i. 1, p. 81.
Digitaria setigera, Roth, Nov. Sp., p. 37; Griseb., Fl. Brit. W. Ind., p. 544.

BERMUDAS.—Introduced. *Rein.*

West Indies and other warm countries.

Panicum virgatum, Linn.

Panicum virgatum, Linn., Sp. Pl., p. 59; Chapm., Fl. Southern U.S., p. 573; Gray, Manual, ed. 5, p. 647.

BERMUDAS.—Introduced. *Rein.*

Eastern North America, growing in sandy soil, and commoner southward.

[*Panicum maximum*, Jacq. "Guinea grass" has been introduced.]

Setaria glauca, Beauv.

Setaria glauca, Beauv.; Griseb., Fl. Brit. W. Ind., p. 554; Chapm., Fl. Southern U.S., p. 578.

BERMUDAS.—Introduced. *Moseley.*

In nearly all temperate and tropical countries.

Oplismenus setarius, Rœm. et Schult.

Oplismenus setarius, Rœm. et Schult., Syst. Veg., ii. p. 481; Kunth, Enum., i. 1, p. 139.
Orthopogon setarius, Spreng.; Griseb., Fl. Brit. W. Ind., p. 545.

BERMUDAS.—Introduced. The caves—*Lefroy.*

West Indies, Tropical America, and tropics of the Old World.

Cenchrus tribuloides, Linn.

Cenchrus tribuloides, Linn., Sp. Pl., ed. 1, p. 1050; Griseb., Fl. Brit. W. Ind., p. 556; Chapm., Fl. Southern U.S., p. 579.

BERMUDAS.—Indigenous. Common on sand hills by the sea—*Lefroy*; the principal binding grass on the sand dunes—*Moseley.*

Widely distributed in America, Africa, and Asia.

The late General Munro seems to have regarded it as a form of the equally common *Cenchrus echinatus*.

Spartina juncea, Willd.

Spartina juncea, Willd., Enum. Pl. Hort. Berol., p. 81; Kunth, Enum., Pl. i. 1, p. 278; Chapm., Fl. Southern U.S., p. 556; Gray, Manual, ed. 5, p. 620.

BERMUDAS.—Indigenous. Rocks in the sea near the hospital—*Reade*.

Sandy and marshy places near the sea from Canada to Florida.

There are several closely allied forms or species on the eastern coast of North America, and some of them reappear in South America.

Stenotaphrum americanum, Schrank.

Stenotaphrum americanum, Schrank., Hort. Monac., t. 98; Griseb., Fl. Brit. W. Ind., p. 544; Chapm., Fl. Southern U.S., p. 579.

BERMUDAS.—Indigenous. Everywhere in dry, rocky places—*Rein; Lefroy; Moseley; Reade*.

Widely distributed both in America and the Old World, chiefly in maritime districts.

Polypogon monspeliensis, Desf.

Polypogon monspeliensis, Desf., Fl. Atl. i., p. 66; Kunth, Enum., i. p. 232; Gray, Manual, ed. 5, p. 612.

BERMUDAS.—Introduced. Common—*Rein; Lefroy*.

A European plant now very widely diffused, especially in maritime districts.

Phalaris canariensis, Linn.

Phalaris canariensis, Linn., Sp. Pl., p. 54; Kunth, Enum., i. 1, p. 31; Gray, Manual, ed. 5, p. 643.

BERMUDAS.—Introduced. Cavendish—*Lefroy*.

Mediterranean region, and naturalised in many other countries.

Sporobolus indicus, R. Br.

Sporobolus indicus, R. Br., Prodr. Fl. N. Holl., p. 170; Griseb., Fl. Brit. W. Ind., p. 533; Chapm., Fl. Southern U.S., p. 550.
Sporobolus elongatus, R. Br., l. c.
Vilfa tenacissima, Trin., Spec. Gram., t. 60.
Sporobolus tenacissimus, Beauv., Agrost., p. 26.

BERMUDAS.—Indigenous? Common—*Rein; Moseley; Jones; Reade*.

Generally diffused in tropical and sub-tropical countries.

Sporobolus virginicus, Kunth.

Sporobolus virginicus, Kunth, Enum., i. p. 210; Griseb., Fl. Brit. W. Ind., p. 533; Chapm., Fl. Southern U.S., p. 550.

BERMUDAS.—Indigenous. Binding grass on the sand dunes—*Moseley*.

Almost as widely distributed as *Sporobolus indicus*.

Sporobolus pungens, Kunth (errore *purgans*), of Rein's list, is probably one of the foregoing species. We have seen no American specimens of the true *Sporobolus pungens*.

Cynodon dactylon, Pers.

Cynodon dactylon, Pers., Ench., i. p. 85; Griseb., Fl. Brit. W. Ind., p. 540; Chapm., Fl. Southern U.S., p. 557; Kunth, Enum., i. 1, p. 259.
Agrostis bermudiana, Tussac ex Kunth, Enum., i. p. 259.

BERMUDAS.—Introduced. Common in cultivated ground—*Lefroy; Munro*.

In tropical and temperate countries all over the globe, but probably not indigenous in America.

This is the plant called "Bermuda Grass" in the United States and elsewhere.

Chloris petræa, Thunb.

Chloris petræa, Thunb., Fl. Cap., p. 109; Griseb., Fl. Brit. W. Ind., p. 539.
Eustachys petræa, Desv., Jour. Bot., 1813, i. p. 69; Chapm., Fl. Southern U.S., p. 557.

BERMUDAS.—Indigenous. Common in dry places—*Moseley; Jones; Reade*.

A coast plant, ranging from North Carolina to Uruguay, and also occurring in Southern Africa.

Leptochloa mucronata, Kunth.

Leptochloa mucronata, Kunth, Enum., i. 1, p. 270; Griseb., Fl. Brit. W. Ind., p. 537 (excl. synon.); Chapm., Fl. Southern U.S., p. 558.
Elensine mucronata, Michx., Fl. Bor.-Am., i. p. 65.

BERMUDAS.—Introduced. *Rein*.

Virginia and Illinois to Florida and the West Indies; common in cultivated ground.

Kœleria phleoides, Pers.

Kœleria phleoides, Pers., Ench., i. p. 97; Kunth, Enum., i. p. 383.

BERMUDAS.—Introduced. *Moseley*.

Widely spread in the Old World; but not, as far as we know, naturalised in any part of America.

Sclerochloa rigida, Panz.

Sclerochloa rigida, Panz., in Regensb. Denkschr., ii. p. 180, ex Kunth, Enum., i. 1, p. 393.

BERMUDAS.—Introduced. *Rein; Moseley; Reade.*

Europe, Northern Africa, &c.

Poa annua, Linn.

Poa annua, Linn., Sp. Pl., ed. 1, p. 68; Chapm., Fl. Southern U.S., p. 562; Gray, Manual, ed. 5, p. 629.

BERMUDAS.—Introduced. *Moseley; Reade.*

A native of the Old World, now naturalised in most temperate and sub-tropical countries.

PHANEROGAMÆ.—GYMNOSPERMÆ.

CONIFERÆ.

Juniperus bermudiana, Linn. (Plate V.)

Juniperus bermudiana, Linn., Sp. Pl., ed. 1, p. 1039; Parlat. in DC. Prodr., xvi. 2, p. 490; Hemsl. in Gard. Chron., n.s., xix. p. 656, figg. 105 et 106, et in Journ. Bot. 1883, pp. 259–261; Hook, Lond. Journ. Bot. 1843, ii. p. 141, t. 1.

Juniperus barbadensis, Linn., Sp. Pl., ed. 1, p. 1039; Griseb., Fl. Brit. W. Ind., p. 503 (*saltem pro parte*).

Juniperus barbadensis Cupressi folio, ramulis quadratis, Pluk., Almag., p. 201, et. Phytogr., t. 197, fig. 4 (*bona*).

Juniperus bermudiana, Hermann in Hort. Acad. Lugd.-Bat. Catal. 1687, pp. 345–347 (*forma juvenis foliis acicularibus sed galbuli errone valde majores descripti ac picti*).

Biota meldensis, Gord., Pinetum, p. 37, fide Parlatorei.

BERMUDAS.—Indigenous. Common throughout the islands, and the only indigenous exogenous tree. The "Cedar" of the islanders.

Also in the West Indies.

As with the indigenous palm and *Sisyrinchium*, so with this; great confusion has prevailed concerning its specific identity, it having been alternately referred to *Juniperus virginiana* and accepted as a distinct species; while other authors, Grisebach, for example, have followed Linnæus and endeavoured to distinguish *Juniperus bermudiana* from *Juniperus barbadensis*. Even now we are unable to give any definite information on its distribution in the West Indies, and we are not absolutely sure that the same form occurs there. Until recently we were of the opinion that *Juniperus bermudiana* was endemic in the Bermudas; but after examining specimens in the Sloane Herbarium in the British Museum, purporting to have come from Jamaica and the Barbados, we have no doubt that they are the same; and the authenticity of their origin is in some measure confirmed by a packet of berries lately received from Jamaica, for they seem to belong to *Juniperus*

bermudiana rather than *Juniperus virginiana*.[1] One of the specimens in the Sloane Herbarium is evidently the type of Plukenet's figure, cited above. Sloane's own Jamaica collections contain specimens of both *Juniperus virginiana* and *Juniperus bermudiana*, the latter being referred to thus—"*An præcedentis varietas.*" On the other hand, there is, with the exception noted below, not a single specimen of *Juniperus bermudiana* in any of the modern collections of West Indian plants either at Kew or the British Museum, the only *Juniperus* represented being *Juniperus virginiana*. Ponthieu, however, collected a specimen of *Juniperus bermudiana* in Antigua, but there is this memorandum on his label—"Brought here from Bermuda, and not common."

Hermann (*op. sup. cit.*) represents a young seedling plant, with the characteristic long spreading leaves, bedecked with berries as large as oranges, if he observed proportion in his drawing! It is quite evident that the artist added the fruit. Hermann's plant was obtained from England; and the true Bermudan cedar was cultivated in England in 1684, as we learn from a letter written by Sir Hans Sloane to Mr Ray in November of that year. Plukenet's figure of the adult state, as already mentioned, seems to have been made from a dried specimen still preserved in the Sloane Herbarium.

Of the so-called Barbados cedar we have only the vaguest information. In his History of the Barbados, Schomburgh makes no mention of a juniper beyond the name *Juniperus barbadensis* in his list of the plants of the island; and Maycock (Flora Barbadensis, p. 395) states that *Juniperus barbadensis* was by no means common at that date (1830) in the island, from which it derived its name.

The Bermudan cedar is easily distinguished from the red cedar (*Juniperus virginiana*), though the latter is very variable in different localities of its very wide area of distribution. In the adult or fertile state—that is, the state with small imbricating leaves, which alone bear flowers—it has thicker ultimate branchlets, owing to the greater thickness of the rather obtuse, not acute, leaves, which, instead of having a distinct gland on the back, like *Juniperus virginiana*, are merely furrowed. The berries are larger, and contain three or more seeds, smaller than those of *Juniperus virginiana*, which are solitary or only two in a berry, so far as we have been able to compare them.

Dr W. G. Farlow, of Cambridge, Massachusetts, states in a letter that he collected good specimens of the juniper during a sojourn in the Bermudas, and they were examined by Dr Engelmann, who pronounced *Juniperus bermudiana* to be a good species, and distinct from *Juniperus barbadensis*; so there would be a third species in the West Indies.

[1] Excellent specimens of *Juniperus bermudiana* from Jamaica have reached Kew at the last moment. Mr D. Morris sends them with the information that this is the only species indigenous in the Blue Mountains.

CRYPTOGAMÆ.—VASCULARES.

LYCOPODIACEÆ.

Psilotum triquetrum, Swartz.

Psilotum triquetrum, Swartz, Synop. Fil., p. 187; Spring, Monogr. Lycop., ii. p. 269; Hook., Fil. Exot., t. 63, et Gen. Fil., t. 87; Griseb., Fl. Brit. W. Ind., p. 648; Chapm., Fl. Southern U.S., p. 601.

Bermudas.—Indigenous. Sea beach, Walsingham—*Lefroy*; Ireland Island—*Reade*.

Nearly all tropical and some sub-tropical regions, but much more abundant in the Old World than in America.

EQUISETACEÆ.

Equisetum, sp.

Equisetum, sp.

Bermudas.—Indigenous. Pembroke Marsh—*Lefroy*.

We have seen no specimens of this plant, which was determined by Mr Sargent of Harvard. It is likely to be the *Equisetum bogotense*, Kunth.

FILICES.

POLYPODIEÆ.

Adiantum bellum, Moore. (Plate XI.)

Adiantum bellum, Moore in Gard. Chron., n.s., xi. p. 172.
Adiantum capillus-veneris of Jones and Rein's list, but not of Linnæus.

Bermudas.—Indigenous. Abundant all over the islands—*Rein*; *Jones*; *Moseley*; *Lefroy*.

If this is to be regarded as a distinct species, it is endemic in the Bermudas; but Mr J. G. Baker named the specimens collected by Mr Moseley *Adiantum cuneatum*, Langs. and Fisch., which species is a native of Brazil and Uruguay, and we think the Bermudan plant is not specifically different. Indeed, the specimens of *Adiantum cuneatum* from the southern part of its area are scarcely distinguishable from the Bermudan.

Moore's description is appended:—

"Fronds tufted, 3 to 6 inches high, bipinnate, ovato-lanceolate; pinnæ of 3 to 6 pinnules, ½ to 1½ inch long, stalked; pinnules cuneate or irregularly transverse-oblong, the somewhat larger terminal ones cuneate and divided into two or three shallow lobes, the margin erose, all shortly pedicellate, the pedicels hair-like, not articulated with the pinnule, but showing at their apex a short y-shaped ebonous furcation, which passes into the flabellate venation; sori various, two or three on the smaller pinnules, short and roundish or longer and sublunate, situate at the apex of the shallow lobes; indusium entire. Caudex thin, shortly creeping with criniform scales; stipes and rhachises ebonous, smooth."

The wild specimens in the Kew Herbarium are at least double the size described by

Moore, who, it may be added, compares his species with *Adiantum fragile*, Swartz, a West Indian species remarkable for the very deciduous nature of its pinnules.

Pteris aquilina, Linn., var. *caudata*.

Pteris aquilina, Linn. Sp. Pl., ed. 1, p. 1075, var. *caudata*, Linn., *loc. cit.* (species); Griseb., Fl. Brit. W. Ind., p. 670; Chapm., Fl. Southern U.S., p. 589.

BERMUDAS.—Indigenous. Common in the marshes of Pembroke, Hamilton, &c.—*Hunter; Rein; Jones; Moseley; Lefroy.*

The species is generally distributed in the tropics and in both north and south temperate zones; and some specimens of the American variety *caudata* are so like the New Zealand variety *esculenta* as to be indistinguishable.

Pteris heterophylla, Linn.

Pteris heterophylla, Linn., Sp. Pl., ed. 2, p. 1534; Griseb., Fl. Brit. W. Ind., p. 668; Hook. and Baker, Synop. Fil., ed. 2, p. 160.

BERMUDAS.—Indigenous. The caves—*Farlow; Moseley; Lefroy.*

A very remarkable and distinct fern, only known from the West Indies, where, however, it is generally spread. The locality Rio, Brazil, Lady Calcott, recorded in Hooker's Species Filicum, ii. p. 166, is almost certainly an error, arising from a mixture of specimens; for the neighbourhood of Rio has been very thoroughly explored, and no other specimen exists at Kew from that country.

Woodwardia virginica, Sm.

Woodwardia virginica, Sm., Act. Taur., v. p. 412; Hook. and Baker, Synop. Fil., ed. 2, p. 188; Chapm., Fl. Southern U.S., p. 591.

BERMUDAS.—Indigenous. Pembroke Marsh—*Lefroy;* without locality—*Rein.*

Eastern North America, from Canada to Florida.

This appears to be quite rare in the Bermudas.

Asplenium dentatum, Linn.

Asplenium dentatum, Linn., Sp. Pl., ed. 1, p. 1080; Hook. and Baker, Synop. Fil., p. 196; Griseb., Fl. Brit. W. Ind., p. 683; Chapm., Fl. Southern U.S., p. 592.

BERMUDAS.—Indigenous. The dell on the path to Paynter's Vale from H. Sound—*Lefroy;* caves at Paynter's Vale—*Moseley;* without locality—*Farlow.*

Florida, West Indies, Mexico, and Guatemala.

Asplenium (Diplazium) laffanianum, Baker. (Plate XII.)

Asplenium (Diplazium) laffanianum, Baker in Gard. Chron., n.s., xvii. p. 673.

Asplenium caudice erecto, paleis lanceolatis sordide brunneis, stipitibus semipedalibus supra basin nudis; frondibus oblongo-deltoideis bipinnatis glabris viridibus pedalibus,

pinnis lanceolatis imbricatis subsessilibus infimis maximis, pinnulis oblongis serratis obtusis basi posteriori cuneato-truncatis superioribus adnatis infimis sessilibus obscure pinnatifidis, pinnularum venis superioribus furcatis inferioribus pinnatis, soris medianis infimis geminis, involucro glabro persistente.

BERMUDAS.—Endemic. Without special localities—*A. Allen; Lefroy; Laffan.*

This species is allied to the well-known West Indian *Asplenium franconis* and *Asplenium crenulatum*. Major-General Sir Robert Laffan, whose name has been associated with this species, succeeded Sir J. H. Lefroy as governor of the islands; and during his governorship, he introduced living plants of it into England.

Asplenium rhizophyllum, Kze.

Asplenium rhizophyllum, Kze. in Linnæa, ix. p. 71, not of Linnæus; Hook. and Baker, Synop. Fil., ed. 2, p. 220.
Asplenium myriophyllum, Spreng. ex Griseb., Fl. Brit. W. Ind., p. 684; Chapm., Fl. Southern U.S., p. 593.

BERMUDAS.—Indigenous. Caves at Paynter's Vale—*Moseley;* in clefts and holes of limestone—*A. Allen;* the caves—*Lefroy.*

Florida, West Indies, Tropical America, and Polynesia.

The fern to which Mr Baker has given this name is midway between typical *Asplenium rhizophyllum* and *Asplenium cicutarium*, and almost the same as *Asplenium monteverdense*, Hook., Second Cent. Ferns, t. 41. *Asplenium cicutarium* proper has a wide range in Tropical America and Africa.

Asplenium trichomanes, Linn.

Asplenium trichomanes, Linn., Sp. Pl., ed. 1, p. 1080; Hook. and Baker, Synop. Fil., ed. 2, p. 196; Griseb., Fl. Brit. W. Ind., p. 683; Chapm., Fl. Southern U.S., p. 592.
Asplenium anceps, Soland in Hook. and Grev. Ic. Fil., t. 195.

BERMUDAS.—Indigenous. Walsingham—*Farlow;* woods in Warwick Parish—*Hunter;* the caves—*Moseley; Lefroy.*

Generally diffused in the north and south temperate regions. The Bermudan variety is that described as *Asplenium anceps.*

Aspidium coriaceum, Swartz.

Aspidium coriaceum, Swartz, Synop. Fil., p. 57; Griseb., Fl. Brit. W. Ind., p. 690.
Aspidium capense, Willd., Sp. Pl., v. p. 267; Hook. and Baker, Synop. Fil., ed. 2, p. 254.

BERMUDAS.—Indigenous. Marshes—*Moseley;* confined to Devonshire Marsh—*Lefroy;* Devonshire Marsh—*Farlow.*

West Indies to Patagonia, and in Polynesia, New Zealand, Australia, South Africa, and the Mascarene Islands.

Aspidium aculeatum, Swartz.

Aspidium aculeatum, Swartz, Synop. Fil., p. 53; Griseb., Fl. Brit. W. Ind., p. 689.

Bermudas.—Indigenous. The caves—*Lefroy*; without locality—*Rein*.

In temperate and sub-tropical regions nearly all over the world.

Nephrodium amplum, Baker.

Nephrodium amplum, Baker in Hook. and Baker, Synop. Fil., ed. 2, p. 285.
Aspidium amplum, Metten. ex Griseb., Fl. Brit. W. Ind., p. 691.

Bermudas.—Indigenous. Caves at Paynter's Vale—*Moseley*; *Farlow*; *Lefroy*.

West Indies to Ecuador, and probably also in Pitcairn Island.

Nephrodium bermudianum, Baker, n. sp. (Plate XIII.)

Nephrodium bermudianum, Baker, n. sp.

Rhizomate breviter reptante, stipite semipedali supra basin haud paleaceo, fronde oblongo-lanceolato subpedali modice firmo parce piloso, rhachi stramineo dense piloso haud paleaceo, pinnis sessilibus vel subsessilibus lanceolatis multijugis patulis ad medium pinnatifidis inferioribus basi posteriore reductis, segmentis secundariis oblongis integris contiguis, venis regulariter pinnatis venulis 5–7 jugis simplicibus raro furcatis, soris parvis medialibus, involucro minute reniformi.

A near ally of the West Indian *Nephrodium asplenioides*, Baker. Central pinnæ 2 to $2\frac{1}{2}$ in. long, $\frac{1}{2}$ to $\frac{3}{4}$ in. broad, the lowest of the frond sometimes but not always dwarfed; final segments, $\frac{1}{12}$ to $\frac{1}{8}$ in. broad; veins always simple, except in the anterior segment of the lower pinnæ, which is often larger than the rest.

Bermudas.—Endemic. Near Paynter's Vale—*Farlow*; without locality—*Lefroy*.

The plant named *Polypodium* (*Goniopteris*) *tetragonum*, Swartz? (Trimen., Journ. Bot. 1877, p. 367), collected by the Rev. R. Hunter at Walsingham, is most likely, Mr Baker informs us, this species, which appears to be endemic in the Bermudas.

Nephrodium patens, Desv.

Nephrodium patens, Desv. in Mém. Soc. Linn. Par., ii. p. 258; Hook. and Baker, Synop. Fil., ed. 2, p. 262.
Aspidium patens, Swartz, Synop. Fil., p. 49; Griseb., Fl. Brit. W. Ind., p. 692; Chapm., Fl. Southern U.S., p. 594.

Bermudas.—Indigenous. Without locality—*Moseley*; *Rein*; Warwick—*Hunter*.

Florida and Texas to Rio and Chili; Polynesia; Japan; Tropical Africa; St Helena.

Nephrodium molle, Desv.

Nephrodium molle, Desv. in Mém. Soc. Linn. Par., ii. p. 258; Hook. and Baker, Synop. Fil., ed. 2, p. 293.
Aspidium molle, Swartz, Synop. Fil., p. 49; Griseb., Fl. Brit. W. Ind., p. 693.

Bermudas.—Indigenous. Without locality—*Rein*; *Reade*.

All tropical countries, and extending in the north temperate regions to the Azores and Hong-Kong, and in the south to the Cape and New Zealand.

There is, however, no specimen from the Bermudas in the Kew Herbarium.

Nephrodium thelypteris, Desv.

Nephrodium thelypteris, Desv. in Mém. Soc. Linn. Par., ii. p. 257; Hook. and Baker, Synop. Fil., ed. 2, p. 271.
Aspidium thelypteris, Swartz, Synop. Fil., p. 50; Chapm., Fl. Southern U.S., p. 594.

Bermudas.—Indigenous. Pembroke Marsh—*Lefroy*; without locality—*Rein*.

Generally diffused in the temperate zones of both hemispheres.

Nephrodium villosum, Presl.

Nephrodium villosum, Presl., Reliq. Hænk., i. p. 38; Hook. and Baker, Synop. Fil., ed. 2, p. 286.
Aspidium villosum, Swartz, Synop. Fil., p. 56; Griseb., Fl. Brit. W. Ind., p. 690.

Bermudas.—Indigenous. Without locality—*Rein*.

West Indies, southward to Peru and Chili.

There are no Bermudan specimens at Kew of this species, which is included on the authority of Rein.

Nephrolepis exaltata, Schott.

Nephrolepis exaltata, Schott, Gen. Fil., with a figure; Hook. and Baker, Synop. Fil., ed. 2, p. 301; Chapm., Fl. Southern U.S., p. 596.
Aspidium exaltatum, Swartz, Synop. Fil., p. 45; Griseb., Fl. Brit. W. Ind., p. 688.

Bermudas.—Indigenous. Devonshire Marsh—*Lefroy*; without locality—*Moseley*; *Rein*.

Generally diffused in tropical countries.

Polypodium pectinatum, Linn.

Polypodium pectinatum, Linn., Sp. Pl., ed. 1, p. 1085; Griseb., Fl. Brit. W. Ind., p. 699.

Bermudas.—Indigenous. Walsingham—*Lefroy*; *Hunter*; without locality—*Rein*.

Florida and Mexico to Peru and Brazil.

Polypodium elasticum, Rich.

Polypodium elasticum, Rich. ex Hook. and Baker, Synop. Fil., ed. 2, p. 332.
Polypodium taxifolium, Linn., Sp. Pl., ed. 1, p. 1086; Griseb., Fl. Brit. W. Ind., p. 699, in part.

Bermudas.—Indigenous. Caves at Paynter's Vale—*Moseley*; without locality—*Lefroy*.

Florida, West Indies, and Mexico to Peru and Brazil.

Acrostichum aureum, Linn.

Acrostichum aureum, Linn., Sp. Pl., p. 1069; Hook. and Baker, Synop. Fil., ed. 2, p. 423; Chapm., Fl. Southern U.S., p. 588.
Chrysodium vulgare, Fée ex Griseb., Fl. Brit. W. Ind., p. 675.

BERMUDAS.—Indigenous. Marshes, growing in dense thickets to a height of four or five feet—*Moseley; Lefroy; Rein.*

A salt-marsh fern, widely distributed in tropical and sub-tropical countries.

OSMUNDACEÆ.

Osmunda cinnamomea, Linn.

Osmunda cinnamomea, Linn., Sp. Pl., ed. 1, p. 1066; Chapm., Fl. Southern U.S., p. 598.

BERMUDAS.—Indigenous. Marshes in Warwick, Pembroke, &c.—*Hunter; Rein; Moseley; Lefroy.*

Canada to Brazil, and in North-Eastern Asia.

Osmunda regalis, Linn.

Osmunda regalis, Linn., Sp. Pl., ed. 1, p. 1065; Chapm., Fl. Southern U.S., p. 598.

BERMUDAS.—Indigenous. Abundant in most of the marshes, where with *Pteris aquilina* it forms the main feature of the herbaceous vegetation—*Moseley;* Pembroke Marsh—*Lefroy;* without locality—*Rein;* marsh in Warwick—*Hunter.*

In nearly all temperate and tropical countries, except Australia and New Zealand

CRYPTOGAMÆ.—CELLULARES.

MUSCI.[1]

Tortula (Trichostomum) bermudana, Mitt.

Tortula (*Trichostomum*) *bermudana*, Mitt., Journ. Linn. Soc. Lond., xv. 60.

Dioica. Caulis humilis infra perichætium innovans. Folia a basi erecta, rotundo-quadrata, cauli appressa, cellulis parvis oblongis pellucidis areolata, exinde erecto-patentia, stricta, sensim angustata, canaliculata, apice obtusiusculo, nervo in mucronulum excurrente, margine integerrimo supra medium incurvo inflexove cellulis minutis rotundis obscuris, perichætialia pauca, basi ovalia, cæteroquin caulinis similia. Theca in pedunculo flavo

[1] By William Mitten, A.L.S., and limited to the species collected by the Challenger Expedition. The authorities for some of the names have been altered in conformity with the rule observed for the other groups of plants.—W. B. H.

ovali-oblonga, erecta, operculo triente breviore. Calyptra usque ad medium thecæ descendens. Peristomium e dentibus geminatis filiformibus rubris.

BERMUDAS.—In extensive patches on calcareous sand.

Caulis lineas quatuor altus, gracilis. Folia flavo-viridia, ætate pallide fusca, sicca incurvata, laxe contorta. Pedunculus subsemiuncialis, gracilis. Theca ætate fusca, ore intensiore colorato.

A small species, which in general appearance is very similar to *Weisia controversa*, but the capsules are not striate when dry and old. The peristome agrees with that found in those species of *Trichostomum* which are closely allied to *Trichostomum crispulum;* and although in the specimens examined the teeth are not contorted, the arrangement of the cells of the operculum is oblique, as is usual in the *Tortulæ* with distinctly twisted peristomes.

Tortula (Hymenostylium) verticillata, Mitt.

Bryum verticillatum, Linn., Sp. Pl., ed. 2, p. 1585; C. Müller, Synop. Musc. Frond., i. p. 656 (sub *Weisia*).

Eucladium verticillatum, Bruch. et Schimp., Bryol. Europ. p. 3, t. i.

BERMUDAS.—In small quantity without fruit.

This species has been so variously arranged in Bryological works that it will be necessary to assign the reasons for its position as above. It has been considered a *Weisia*, *Grimmia*, *Coscinodon;* and at length, in the Bryologia Europea, it forms the genus *Eucladium*, which, although pointed out by Wilson to be a name pre-occupied, has been retained in the second edition of Schimper's Synopsis. If the characters of this genus be considered, it will be found that they rest chiefly on the presence of the peristome. In the first edition of the Synopsis, *Eucladium* is placed in the *Pottiaceæ*, and the author says it is "*genus paradoxum, sedis incertæ;*" in the second edition it has been removed to the family Weisiaceæ, and is placed next following *Gymnostomum*, which consists of three species, only one of which, *Gymnostomum curvirostrum*, is found in that genus as first enumerated in Hedwig's Species Muscorum, where it stands as *Gymnostomum recurvirostrum*. With the exception of *Gymnostomum tenue*, all the other species then recorded have since passed to genera founded on characters not dependent on the peristome, such as *Schistostega* and *Physiomitrium*.

In the Bryologia Universa, Bridel published in 1826 two genera which succeeding authors have passed over almost unnoticed. Of these the first is *Hymenostylium* (l. c. ii. 82) to contain the *Gymnostomum xanthocarpum*, Hooker (Musci Exotici, t. 153), a species so intimately allied to the European *Gymnostomum rupestre* and *Gymnostomum curvirostrum*, as mentioned in the original description, that they cannot be regarded otherwise than as congeneric. This was not then evident to Bridel, for in the supplement

to vol. i. 761, he describes *Entosthymenium*, the single species being *Entosthymenium tristichum*, which he says was sent from Dax by Grateloup to De Candolle's Herbarium. No specimen is said by C. Müller (Synopsis, ii. 635) to be now in Bridel's Herbarium; but if the description be compared with specimens of *Gymnostomum curvirostrum*, it will be found to agree in all particulars, especially in his statement that the foliage is subtristichous, a specific character elsewhere entirely overlooked.

Two genera were thus described by Bridel without his claiming the European species, *Gymnostomum curvirostrum*, which must belong to the first, and which is really identical with the last; so that of the species originally placed in *Gymnostomum* by Hedwig there remained to represent that group only *Gymnostomum tenue*.

It is a curious coincidence that Bridel (Bry. Univ., i. 376) finishes his account of his *Coscinodon verticillatus* with "*Cave ne cum Gymnostomo curvirostro habitu colore et vita in calcareis satis simili commisceas*," and the position assigned to these mosses in the last edition of Schimper's Synopsis, showing that both had arrived at the same conclusions as to their affinity, but also without seeing that they stood in the same relation to each other as that observable among the species of *Zygodon* and *Orthotrichum*, and thus that *Eucladium* might be the peristomate state of *Gymnostomum* = *Hymenostylium*.

Tortula melanocarpa, Mitt.

Tortula melanocarpa, Mitt. in Journ. Linn. Soc. Lond., xv. 60.
Gymnostomum barbula, Schwægrichen, ii. 1. 77, t. 175.
Hyophila barbula, Hampe in Bot. Zeit., 1846, 267; C. Müller, Synop. Musc. Frond., i. 558; Mitt., Musc. Austr. Amer., in Journ. Linn. Soc. Lond., xii. p. 136 (sub *Weisia*).

Bermudas.—On calcareous matter.

This species was wrongly described in the Journ. Linn. Soc. Lond., xv. 60, as having a peristome, the capsule from which the description of that organ was taken being afterwards found to belong to *Tortula bermudana*, with which it had been intermixed. The figure given by Schwægrichen well represents the moss, which was originally gathered in Cuba, from whence Wright distributed his specimens. It is not recorded from any other locality. On dissolving out the calcareous white substance in which the Bermudan specimens were imbedded, the stems are found to have short branches, some of which bear a male flower. The species is therefore monœcious; and the male flower, which, in all acrocarpous mosses, is the first produced, becomes lateral from growth of the innovation bearing the female and at length the fruit, leaving the male, which had been terminal, as if it were a secondary growth on a proper branch.

Hyophila, Bridel (Bry. Univ., i. 760), was founded on a species now referred to *Entosthodon* = *Entosthodon rottleri*, the *Gymnostomum rottleri* of Schwægrichen, and the *Gymnostomum javanicum*, Nees et Blume. This last, with some other similar or allied mosses, stands in C. Müller's Synopsis as Section III., *Hyophila*, of his genus *Pottia*.

Besides *Hyophila javanica*, it includes *Hyophila spathulata*, *Hyophila cylindrica*, and *Hyophila tortula*; and, if the nearest allied mosses be sought for, they must be found in such *Tortulæ* as the *Barbula javanica*, Dozy et Molk., Musc. Archip. Ind., t. xviii., which, if it had no peristome, would have exactly agreed with the species named, so that *Hyophila* as a genus is, in fact, but an incomplete *Tortula*; yet it may serve perhaps as a name for a number of species which do not exactly correspond to any described section of that numerous family.

From the *Hyophilæ* above mentioned, *Hyophila barbula* = *Tortula melanocarpa*, differs in the areolation of its leaves and its very near affinity to *Trichostomum brevicaule*, Hampe, found on the cement of buildings in Java, and also to Schimper's *Gyroweisia tenuis*, formerly *Gymnostomum tenue*, and his *Gyroweisia reflexa*, the *Weisia reflexa*, Brid., t. 355, placed in the second edition of his Synopsis immediately before his genus *Gymnostomum*. All these species present but little difference from *Hymenostylium* as outlined here, and are mosses to which lime is so essential that they are only found upon it or in its close proximity.

The rearrangement of the family of Tortuloid mosses is as yet a matter of great difficulty: it is easy to see that they fall into natural groups very difficult to define in words, and that many of the older genera are but of negative value. Thus *Pottia* runs into *Anacalypta*, and this into *Desmatodon*, and on to *Syntrichia*; and *Systegium*, through *Hymenostomum*, is connected with *Weisia*, and through some *Trichostoma* with such complete *Tortulæ* as *Tortula tortuosa*. It is these considerations that have led to the continuance here of the name *Tortula melanocarpa* instead of that of *Tortula barbula*, for by many authors *Tortula* and *Barbula* are considered synonyms of the same idea; and much more may yet be known respecting the limits of *Hymenostylium*, which, if capable of definition, might well include this species as *Hymenostylium barbula*.

Bryum dichotomum, Hedw.

Bryum dichotomum, Hedw., Sp. Musc., p. 183, t. 42; C. Müller, Synop. Musc. Frond., i. p. 304.
Bryum atropurpureum, Web. et Mohr; Bryol. Europ., t. 37.

Bermudas.—With *Tortula bermudana*, barren.

This species is probably cosmopolitan.

Rhacopilum tomentosum, Brid.

Rhacopilum tomentosum, Brid., Musc. Univ., ii. p. 719.
Hypnum tomentosum, Hedw., Musc. Frond., iv. p. 48, t. 19.
Hypopterygium tomentosum, C. Müller, Synop. Musc. Frond., ii. p. 12.

Bermudas.—In small quantity, but fertile.

Common probably in all the West Indian Islands, and extending to Southern Brazil.

Isopterygium tenerum, Mitt.

Isopterygium tenerum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 499.
Hypnum tenerum, Swartz, Fl. Ind. Occ., iii. p. 1817.

BERMUDAS.—Well-fruited specimens.

The species is probably spread throughout all the West Indian Islands and the more northern parts of South America, but seems replaced in Brazil by some other similar forms. In Trimen's Journal of Botany, ix. 295, Mr Spruce has some remarks on this group, which he considers identical with *Plagiothecium*. He there quotes the characters by which *Leucomium* was described for those of *Isopterygium*, so that, notwithstanding he had himself gathered all these mosses, and had the very best means of understanding them, his conclusions are derived from a fallacy, and have no pertinence, *Leucomium* being composed of species very different; and it is noteworthy that Schimper did not include the European *Isopterygium depressum* in his enumeration of the species of *Plagiothecium*, but put it in his *Rhynchostegium*.

Sphagnum cymbifolium, Ehrh.

Sphagnum cymbifolium, Ehrh. in Hannov. Mag., 1780, p. 235, ex C. Müller, Synop. Musc. Frond., i. p. 91.

BERMUDAS.—Barren.

Sphagnum cuspidatum, Ehrh., var. *plumosum*.

Sphagnum cuspidatum, Ehrh., Crypt., n. 251; C. Müller, Synop. Musc. Frond., i. p. 96, var. *plumosum*.

BERMUDAS.—Without fruit.

HEPATICÆ.

Cephalozia connivens, Lindb.

Cephalozia connivens, Lindb. in Journ. Linn. Soc. Lond., xiii. p. 190.
Jungermannia connivens, Dicks., Crypt. fasc., iv. p. 19, t. 11, fig. 15; Hook., Brit. Jung., n. 15.
Blepharostoma connivens, Dumortier, Rev. Jung., p. 18, et Hepaticæ Europæ, p. 96.

BERMUDAS.—A few fragments, and on *Riccardia*.

Pleuroschisma prostrata, Mitt.

Sphagnoecetis prostrata, G. L. et N., Synop. Hepat., p. 149.
Jungermannia prostrata, Sw., Prodr. Fl. Ind. Occ., p. 143.

BERMUDAS.—In spreading tufts.

This seems to differ from the common round-leaved states of *Pleuroschisma sphagni* in its rather smaller size and more oval oblong leaves. It is found also in Europe.

Radula pallens, Nees.

Radula pallens, Nees in G. L. et N. Synop. Hepat., pp. 256 et 726.
Jungermannia pallens, Sw., Prodr. Fl. Ind. Occ., p. 143, et Fl. Ind. Occ., iii. p. 1847.

BERMUDAS.—In large spreading patches of the usual brown colour, but without perianths. Specimens were also collected in the same state by General Lefroy.

Aneura palmata, Nees ?

Jungermannia palmata, Hedw. ? Theor., Gen., ed. 1, t. 18, ex G. L. et N. Synop. Hepat., p. 499 (sub *Aneura*).

BERMUDAS.—Without fructification, and in a poor state.

Otiona aitonia, Lindb. et Nees (*Plagiochasma*).

Plagiochasma aitonia, Lindb. et Nees in G. L. et N. Synop. Hepat., p. 520.

BERMUDAS.—Barren.

Dumortiera hirsuta, R. Bl. et Nees.

Dumortiera hirsuta, R. Bl. et Nees in G. L. et N. Synop. Hepat., p. 543.
Marchantia hirsuta, Sw., Prodr. Fl. Ind. Occ., p. 145, et Fl. Ind. Occ., iii. p. 1879.

BERMUDAS.—Specimens with perfected fruit.

LICHENES.[1]

COLLEMACEI.

COLLEMEI.

Leptogium diaphanum, Mont.

Leptogium diaphanum, Mont.; Nyl., Synop. Lich., i. p. 125; Crombie in Journ. Linn. Soc. Lond., xvi. p. 214.
Leptogium tremelloides, var. *mesotomum*, Stirton in Journ. Linn. Soc. Lond., xiv. p. 369.
Lichen diaphanus, Swartz, Fl. Ind. Occ., p. 1893.

BERMUDAS.—On the bark of trees; fertile—*Moseley*.

Jamaica; Peru; Tahiti; Philippines.

Leptogium tremelloides, Fries.

Leptogium tremelloides, Fries; Nyl., Synop. Lich., i. p. 124; Crombie in Journ. Linn. Soc. Lond., xvi. p. 214.
Leptogium marginellum, Stirton in Journ. Linn. Soc. Lond., xiv. p. 369.

BERMUDAS.—On the bark of trees; fertile—*Moseley*.

Almost cosmopolitan, except in the colder regions.

[1] The Rev. J. M. Crombie kindly gave his help in drawing up this list.

LICHENACEI.

Cladoniei.

Cladonia acuminata, var. *hebescens*, Nyl.

Cladonia acuminata, var. *hebescens*, Nyl., n. var. in Journ. Linn. Soc. Lond., xvi. p. 214.

Differt a *Cladonia acuminata* squamulis crassiusculis subconvexulis. Sterilis modo visa. Forsan propria species.

Bermudas.—On the ground; very sparingly seen—*Moseley*.

Cladonia fibula, Hoffm.

Cladonia fibula, Hoffm., Fl. Germ., p. 127; Crombie in Journ. Linn. Soc. Lond., xvi. p. 214.
Cladonia turgida et var. *elegans*, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Bermudas.—On the ground; fertile—*Moseley*.

Europe, and doubtless other regions.

Cladonia mitrula, Tuckerm.

Cladonia mitrula, Tuckerm. in Darlingt. Fl. Cestr., p. 444, et Gen. Lich., p. 147; Nyl., Synop. Lich., i. p. 203; Crombie in Journ. Linn. Soc. Lond., xvi. p. 214.
Cladonia botrytes, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Bermudas.—On the ground; fertile—*Moseley*.

Common throughout the southern states of North America, and extending to Mexico and Cuba.

Cladonia pungens, Flœrk.

Cladonia pungens, Flœrk., Comm. Clad., p. 156; Crombie in Journ. Linn. Soc. Lond., xx. p. 83.
Cladonia furcata, Hoffm., var. *pungens*, Fries, Lich. Europ., p. 230; Nyl., Synop. Lich., i. p. 207.

Bermudas.—On the ground; sterile—*Moseley*.

Europe; Africa; North and South America; India; Australia.

Ramalinei.

Ramalina complanata, Achar.

Ramalina complanata, Achar., Lich. Univ., p. 599; Crombie in Journ. Linn. Soc. Lond., xvi. p. 215.
Ramalina calicaris, forma 5, *complanata*, Nyl., Synop. Lich., i. p. 295.
Lichen complanatus, Swartz, Fl. Ind. Occ., p. 1911.
Ramalina bermudiana, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Bermudas.—On branches of trees; fertile—*Moseley*.

West Indies; Mexico; subtropical South America; Africa (Senegal); South Australia.

Parmeliei.

Parmelia tinctorum, Despr.

Parmelia tinctorum, Despr.; Nyl. in litt. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 215.
Parmelia liliacea, var. *scortea*, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Bermudas.—On putrid trunks; sterile—*Moseley*.

West Indies; Eastern Asia; but not rightly known.

Parmelia perlata, Achar.

Parmelia perlata, Achar., Meth. Lich., p. 216; Nyl., Synop. Lich., p. 379; Tuckerm., Gen. Lich. p. 21; Crombie in Journ. Linn. Soc. Lond., xvi. p. 215.
Parmelia physodes, var. *labrosa*, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Bermudas.—On old wood; sterile and sorediferous—*Moseley*.

Cosmopolitan, except frigid regions.

Physciei.

Physcia leana, Tuckerm.

Physcia leana, Tuckerm. in Nyl. Synop. Lich., i. p. 423; Crombie in Journ. Linn. Soc. Lond., xvi. p. 215.
Parmelia leana, Tuckerm. in Lea Catal. Pl. Cincinn., p. 45.
Physcia speciosa, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Bermudas.—On mossy trunks; fertile. Smaller state—*Moseley*.

United States (Ohio).

Physcia obsessa, Nyl.

Physcia obsessa, Nyl., Synop. Lich., i. p. 426; Crombie in Journ. Linn. Soc. Lond., xvi. p. 215.
Physcia stellaris, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Bermudas.—On thin bark, very sparingly; fertile—*Moseley*.

Lecanorei.

Lecanora subfusca, var. *sylvestris*, Nyl.

Lecanora subfusca, var. *sylvestris*, Nyl. in Mand. Lich. Mader., n. l.; Crombie in Journ. Linn. Soc. Lond., xvi. p. 215.

Bermudas.—On thin bark associated with *Physcia obsessa*—*Moseley*.

(Spores 0·008–0·011 millim. long by 0·004–0·007 millim. thick.)

Previously known only from Madeira.

Lecanora chlaronella, Nyl.

Lecanora chlaronella, Nyl., n. sp.
Lecanora varia, var. *symmicta*, Stirton in Journ. Linn. Soc. Lond., xiv. p. 370.

Similis *Lecanoræ chlaroterodi*, Nyl. in Flora, 1876, p. 508, Cubanæ, sed differt gelatina hymenialis iodo vinose fulvescente (præcedentia cærulescentia). Spermogonia non visa.—Journ. Linn. Soc. Lond., xvi. p. 215.

Bermudas.—On bark of trees; a very small specimen only seen—*Moseley*.

Lecanora bermudensis, Nyl.

Lecanora bermudensis, Nyl., sp. n.
Lecanora subfusca, var. *argentata*, Stirton in Journ. Linn. Soc. Lond., xiv. p. 371.

Affinis *Lecanoræ umbrinæ*, sed mox differens, margine thallino apotheciorum integro, paraphysibus graciliscentibus, &c. Thallus K—.—Journ. Linn. Soc. Lond., xvi. p. 215.

Bermudas.—On bark of trees—*Moseley*.

Lecanora glaucomodes, Nyl.

Lecanora glaucomodes, Nyl. in Flora, 1876, p. 509; subsp. *conflectens*, Nyl. in Journ. Linn. Soc. Lond., xvi. p. 215.
Lecanora angulosa, var. *albo-pruinosa*, Stirton in Journ. Linn. Soc. Lond., xiv. p. 371.

Differt, *Lecanora conflectens* a *Lecanora glaucomodi*, paraphysibus distinctis, iodo gelatina hymeniale vinose fulvescente, &c.

Bermudas.—On the bark of trees—*Moseley*.

The typical form was collected in Cuba.

Pertusariei.

Pertusaria papillata, Tuckerm.

Pertusaria papillata, Tuckerm., Synop. Lich. N. Am., p. 85; Journ. Linn. Soc. Lond., xvi. p. 215.
Pertusaria leioplaca, Stirton in Journ. Linn. Soc. Lond., xiv. p. 371.

Bermudas.—On the bark of trees; a mere fragment—*Moseley*.

North America.

Pertusaria pustulata, Schær.

Pertusaria pustulata, Schær, Spicil., p. 66; Nyl. in Triana et Planchon Prod. Flor. Nov. Granat. Crypt., p. 35; Crombie in Journ. Linn. Soc. Lond., xvi. p. 216.
Pertusaria melaleuca, Turn et Borr.; Stirton in Journ. Linn. Soc. Lond., xiv. p. 371.

Bermudas.—On the bark of trees; sparingly seen—*Moseley*.

Europe and North and South America.

LECIDEEI.

Lecidea fuscorubescens, Nyl.

Lecidea fuscorubescens, Nyl., Lich. Andam., p. 10; Journ. Linn. Soc. Lond., xvi. p. 216.
Lecidea caliginosa, Stirton in Journ. Linn. Soc. Lond., xiv. p. 371.

BERMUDAS.—On the bark of trees—*Moseley*.

West Indies; Asia (Andaman Islands).

Lecidea euporiza, Stirton.

Lecidea euporiza, Stirton, n. sp.

Thallus pallidus vel pallide cinereus, tenuis; apothecia parva, flavida, demum fusca, pellucida, plana, margine obscuriore, sessilia vel elevato-sessilia, intus nonnihil purpurascentia, cæteroquin incoloria; sporæ 8-næ, incolores, simplices, cylindraceæ, 0·02–0·032 millim. longæ, 0·0035 millim. crassæ, rectæ vel interdum curvulæ; paraphyses conglutinatæ et indistinctæ. Gelatina hymenialis iodo cærulescens, dein fulvescens.—Journ. Linn. Soc. Lond., xiv. p. 371.

BERMUDAS.—On the bark of trees—*Moseley*.

Thallus nearly concealed by an imperfectly developed and barren collema.

Lecidea semiusta, Stirton.

Lecidea semiusta, Stirton, n. sp.

Thallus niger, rimoso-diffractus, squamulosus, squamulis marginibus recurvis; apothecia nigra, sessilia, plana, marginata; sporæ 8-næ, incolores, elongato-ellipsoideæ rectæ vel curvulæ, normaliter 3-septatæ, interdum 1-septatæ vel simplices, 0·008–0·01 millim. longæ, 0·003 millim. crassæ; paraphyses indistinctæ, apicibus incoloribus; hypothecium leviter fuscescens. Gelatina hymenialis iodo dilute cærulescens, dein obscure violacea tincta.—Journ. Linn. Soc. Lond., xiv. p. 371.

BERMUDAS.—On rocks—*Moseley*.

"This belongs to the section of *Lecidea trachona*, Flot., and, indeed, may be merely a state of that species; but the fragment on which only two apothecia are visible is scarcely determinable. Spores 0·009–0·011 millim. long, 0·003 millim. thick."—Crombie in Journ. Linn. Soc. Lond., xvi. p. 216.

Lecidea revertens, Stirton.

Lecidea revertens, Stirton, n. sp.

Thallus (K— C—) albidus, continuus, tenuis, subfarinaceus; apothecia subinnata, minuta, fusco-nigra, humida, fusca, pellucida, margine obscuriore fere nigro, intus incoloria; sporæ 8-næ, incolores, simplices, fere cylindraceæ, 0·007 millim. longæ, 0·0025 crassæ, non

rite evolutæ; hypothecium incolor. Gelatina hymenialis iodo leviter cærulescens, dein obscure violacea.—Journ. Linn. Soc. Lond., xiv. p. 372.

BERMUDAS.—On calcareous rocks; a mere fragment—*Moseley*.

"This species is apparently closely allied to *Lecidea misella*. Spores 0·006–0·008 millim. long, 0·002–0·003 thick."—Crombie in Journ. Linn. Soc. Lond., xvi. p. 216.

Lecidea insperata, Nyl.

Lecidea insperata, Nyl. fide Crombie in Journ. Linn. Soc. Lond., xvi. p. 216.
Lecanora insperata, Nyl. in Triana et Planchon Prod. Fl. Nov. Granat. Crypt., p. 31.

BERMUDAS.—On the bark of trees associated with *Pertusaria pustulata*—*Moseley*.

South America (New Grenada).

Graphis afzelii, Achar.

Graphis afzelii, Achar., Synop., p. 85; Journ. Linn. Soc. Lond., xvi. p. 216.

BERMUDAS.—On bark of trees—*Moseley*.

All tropical countries, from Eastern Asia to South America.

Graphis (Lecanactis) lobata, Eschw.

Graphis (Lecanactis) lobata, Eschw. in Mart. Fl. Bras., p. 100; Journ. Linn. Soc. Lond., xvi. p. 216.
Graphis punctiformis, Stirton in Journ. Linn. Soc. Lond., xiv. p. 372.

BERMUDAS.—On bark of trees—*Moseley*.

South America (Brazil).

Graphis scripta, Achar.

Graphis scripta, Achar., Lich. Univ., p. 265; Crombie in Journ. Linn. Soc. Lond., xvi. p. 216.
Graphis nematodes, Stirton in Journ. Linn. Soc. Lond., xiv. p. 372.

BERMUDAS.—On branches of trees—*Moseley*.

Almost cosmopolitan, except the colder regions.

Arthonia polymorphoides, Nyl.

Arthonia polymorphoides, Nyl. sp. n.
Arthonia interveniens, Stirton in Journ. Linn. Soc. Lond., xiv. p. 372, non Nyl.

Sat similis *Arthoniæ polymorphæ* Achar. sed mox differt gelatina hymeniali iodo persistenter cærulescente et sporis vinose rubescentibus. Sporæ oblongæ, 5-septatæ, longit. 0·016–0·023 millim., crassit. 0·006–0·007 millim. Spermatia arcuata, longit. 0·012–0·016 millim., crassit. 0·0005 millim.—Journ. Linn. Soc. Lond., xvi. p. 216.

BERMUDAS.—On the bark of trees—*Moseley*.

Arthonia rubella, subsp. *inferiuscula*, Nyl.

Arthonia rubella, subsp. *inferiuscula*, Nyl.
Arthonia velata, Stirton, n. sp. in Journ. Linn. Soc. Lond., xiv. p. 372 (*nomen ante adhibitum*).

Differt ab *rubella* præsertim sporis nonnihil minoribus, 0·023–0·030 millim. longit., 0·009–0·015 millim. crassit.—Journ. Linn. Soc. Lond., xvi. p. 217.

Bermudas.—On the bark of trees; very sparingly seen—*Moseley*.

Pyrenocarpei.

Verrucaria ruderella, Nyl.

Verrucaria ruderella, Nyl. sp. n.

Similis *Verrucaria ruderum*, sed sporis longe minoribus, longit. 0·014–0·019 millim., crassit. 0·009–0·012 millim.—Journ. Linn. Soc. Lond., xvi. p. 217.

Bermudas.—On calcareous rocks, very sparingly, associated with *Lecidea semiusta*—*Moseley*.

Endococcus thalamita, Nyl.

Endococcus thalamita, Nyl. sp. n.

Pyrenia habet incoloria vel dilute fuscescentia immersa (latit. circiter 0·1 millim. vel minora) in thalamio *Lecideæ insperatæ*; thecæ polysporeæ; sporæ fuscæ, ellipsoideæ leviter 1-septatæ, longit. 0·007–0·010 millim., crassit. 0·003–0·004 millim. Iodo gelatina hymenialis vinose rubescens. Apothecia parasita occupata sine paraphysibus, thecis, etc. —Journ. Linn. Soc. Lond., xvi. p. 217.

Bermudas.—On the bark of trees, sparingly, associated with *Pertusaria pustulata*—*Moseley*.

Trypethelium cruentum, Mont.

Trypethelium cruentum, Mont., Syll. Crypt., p. 372; Journ. Linn. Soc. Lond., xiv. p. 372.

Bermudas.—On branches of trees—*Moseley*.

Tropical South America; Island of Rodriguez; Australia.

As this is going through the press, a small collection of Bermudan lichens, named by Prof. Ed. Tuckerman, has been received at Kew from Dr W. G. Farlow. In addition to some of the foregoing it includes others bearing the following names: *Physcia crispa*, Nyl., *Physcia picta*, Tuck., *Pyrenula aurantiaca*, Fée, *Pyrenulæ lacteæ* aff., *Cladonia fimbriata*, *Gyalecta Farlowii*, Tuck., *Opegrapha ophites*, Tuck., *Arthonia atrata*, Fée, *Pyxine picta*, Tuck., *Glyphis acharviana*, Tuck., *Lecanora punicea*, Ach., *Lecanora pallescens*, Fr., *Verrucaria rupestris* and *Verrucaria bermudiana*, Tuck.

FUNGI.[1]

HYMENOMYCETES.

AGARICINI.

Agaricus (Mycena) alphitophorus, Berkl.

Agaricus (*Mycena*) *alphitophorus*, Berkl. in Journ. Linn. Soc. Lond., xv. p. 48.

Minutus, totus aleuriatus niveus; pileo conico-campanulato; stipite filiformi; lamellis angustis adscendentibus.

BERMUDAS.—Endemic. On small twigs, Devonshire Marsh—*Moseley*.

Scarcely a line high; stem half to one inch high, covered, as well as the pileus, with white mealy particles. Very delicate.

Agaricus (Mycena) corticola, Schum.

Agaricus (*Mycena*) *corticola*, Schum., Fl. Saell. n. 4689 ex Fries, Hymen. Europ., p. 152; Ic. Fung., t. 85; Cooke, Illus., t. 164, A.; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

BERMUDAS.—On dead wood—*Moseley*.

Northern hemisphere.

Agaricus (Entoloma), sp. Berkl.

Agaricus (*Entoloma*) sp. Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

BERMUDAS.—A single specimen only, in very bad condition—*Moseley*.

It belongs clearly to the same section as *Agaricus nidorosus*, of which it has the irregular spores.

Agaricus (Nolanea) helictus, Berkl.

Agaricus (*Nolanea*) *helictus*, Berkl. in Journ. Linn. Soc. Lond., xv. p. 48.

Pileo profunde umbilicato sericeo; stipite torto; lamellis primum dente decurrentibus, demum adnexis; mycelio candido.

BERMUDAS.—Endemic. On rotten leaf-mould—*Moseley*.

Pileus about one inch across; stem one and a half inch high, slender. Very much wrinkled; when dry, of a pale umber, sometimes browner towards the margin; spores irregular, 0·0003 inch long.

In very young specimens the stem is darker; but without any information as to its colour when recent, its exact affinities cannot be ascertained.

[1] We are indebted to Dr M. C. Cooke for assistance in drawing up the enumeration of this group.

Agaricus (Eccilia) rhodocylix, Lasch.

Agaricus (Eccilia) rhodocylix, Lasch in Linnæa, iv. n. 567; Fries, Hymen. Europ., p. 213; Cooke, Illus., t. 343, B.; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

BERMUDAS.—On the ground—*Moseley*.

Northern Europe; also occurring in Cuba.

Agaricus (Galera) tener, Schæff.

Agaricus (Galera) tener, Schæff., Ic. Fung. Bav., t. 70, figg. 6–8; Bull., Champ., t. 535, fig. 1; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

BERMUDAS.—On the ground—*Moseley*.

Widely dispersed in north temperate regions, and occurring in Tasmania, Australia.

Agaricus (Panæolus) papilionaceus, Bull.

Agaricus (Panæolus) papilionaceus, Bull., Champ., t. 561, fig. 2; Fries, Hymen. Europ., p. 311; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

BERMUDAS.—On dung—*Moseley*.

Europe; India; United States; Natal; Australia.

Marasmius sabali, Berkl.

Marasmius sabali, Berkl. in Journ. Linn. Soc. Lond., xv. p. 49.

Pileo reniformi tomentoso, demum resupinato; stipite brevissimo; lamellis distantibus adnatis postice rotundatis crassiusculis integerrimis, interstitiis venosis.

BERMUDAS.—Endemic. On leaf-stalks of *Sabal*—*Moseley*.

Pileus probably white when fresh; but the whole plant, when dry, is of a pinkish buff, soon resupinate, then at length sulcate; spores subglobose, 0·00028 inch long, hollowed out on one side.

Marasmius obscuratus, Berkl. et Broome.

Marasmius obscuratus, Berkl. et Broome in Journ. Linn. Soc. Lond., xiv. p. 38, et Berkl., l. c., p. 351.

BERMUDAS.—On bark—*Moseley*.

Either opaque or transparent, minutely pulverulent, gills broad. I can find no distinguishing character between this and the Ceylon species.

Ceylon.

Marasmius bermudensis, Berkl.

Marasmius bermudensis, Berkl. in Journ. Linn. Soc. Lond., xv. p. 49.

Pileo convexo pulverulento albido subsulcato, margine inflexo; stipite brevi sursum pellucido, deorsum pulverulento; lamellis distantibus breviter adnatis, interstitiis lævibus.

BERMUDAS.—Endemic. On dead coffee-wood, Paynter's Vale—*Moseley*.

Pileus about one line across; stem quarter to half an inch high; gills, when dry, pale tawny, with a white edge.

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Polyporei.

Polyporus (Mesopus) arcularius, Fries.

Polyporus (Mesopus) arcularius, Fries, Syst. Myc., i. p. 342; Hymen. Europ., p. 526.

Bermudas.—Marsh near Mount Langton, on dead sticks—*Moseley*.

A slender form with a hispid stem.

Very widely dispersed in temperate and tropical regions.

Polyporus (Resupinatus) obliquus, Fries.

Polyporus (Resupinatus) obliquus, Fries, Syst. Myc., i. p. 378; Epicr., p. 482; Berkl. in Journ. Linn. Soc. Lond., x. p. 317 et xiv. p. 351.

Bermudas.—On dead sticks—*Moseley*.

Generally dispersed in warm and temperate countries.[1]

Auricularini.

Stereum lobatum, Fries.

Stereum lobatum, Fries, Epicr., p. 547; Berkl. in Journ. Linn. Soc. Lond., x. p. 331 et xiv. p. 351.

Bermudas.—On dead sticks—*Moseley*.

A small resupinate form.

Generally dispersed in warm countries, and extending in the southern hemisphere to New Zealand.

Tremellini.

Hirneola coffeicolor, Berkl.

Hirneola coffeicolor, Berkl. in Journ. Linn. Soc. Lond., xv. p. 49.

Coffeicolor foliacea parva, subtus glabra.

Bermudas.—Endemic. On coffee-bark, Paynter's Vale—*Moseley*.

The specimens are few in number, and possibly young. There seems, however, to be a fertile and a barren side; and if so, they must be referred to *Hirneola*, though the under side is smooth.

Hypodermei.

Uredo vincetoxici, DC.

Uredo vincetoxici, DC., Fl. Fr., vi. p. 85; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

Bermudas.—On leaves of oleander—*Moseley*.

Europe.

[1] Several other species of *Polyporus* are erroneously recorded from Bermuda in Cooke's list of the species of this genus, in consequence of the author having overlooked the heading "Bahia" in the *Journal of the Linnean Society*, xv. p. 49, nearly at the bottom.

Ustilago carbo, Tul.

Ustilago carbo, Tul., Mém. Ustil., p. 78; Fisch. Waldh. in Ann. Sc. Nat., série 6, iv. p. 200; Berkl. in Journ. Linn. Soc. Lond., xv. p. 49.

Bermudas.—Without any memorandum—*Moseley*.

Generally dispersed where wheat, oats, and barley are cultivated.

Puccinia lantanæ, Farlow.

Puccinia lantanæ, Farlow, MSS. in Herb. Cooke.

Hypophylla. Uredo cum teleutosporis immixta.

Soris minutis sparsis vel plerumque in cæspitulis maculæformibus aggregatis, atro-fuscis. Uredosporis globosis ovatisque lævibus fuscis (0·02 × 0·015 mm. diam.) Teleutosporis ellipticis, medio constrictis, supra rotundatis, infra in stipitem brevem attenuatis, lævibus, fuscis (0·03–0·035 × 0·018–0·02 mm).—M. C. Cooke, MSS.

Bermudas.—On leaves of *Lantana odorata*—*Farlow*.

ASCOMYCETES.

Pyrenomycetes.

Hypoxylon concentricum, Grev.

Hypoxylon concentricum, Grev., Crypt. Scot. Flor., vi. t. 324; Saccardo, Syll. Fung., iii. p. 393 (sub. *Daldinia*); Berkl. in Journ. Linn. Soc. Lond., xv. p. 49.

Bermudas.—On dead wood, Devonshire Marsh—*Moseley*.

Widely diffused in temperate and tropical regions.

Hypoxylon multiforme, Fries.

Hypoxylon multiforme, Fries, Summ. Veg. Scand., p. 384; Saccardo, Syll. Fung., i. p. 363; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

Bermudas.—On decayed wood—*Moseley*.

Throughout Europe, India, and North America, northward to Kamtschatka.

Sphæria mammæformis, Pers.

Sphæria mammæformis, Pers., Synop. Fung., p. 64; Saccardo, Syll. Fung., iii. p. 258 (sub *Rosellinia*); Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

Bermudas.—On dead sticks, both on the bark and on the wood; in the former case looking very like a *Verrucaria*—*Moseley*.

North and south temperate regions.

Asterina pelliculosa, Berkl.

Asterina pelliculosa, Berkl. in Hook. f. Fl. Antarct., ii. p. 453, t. 164, fig. 1; Saccardo, Syll. Fung., iii. p. 46; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 352.

BERMUDAS.—On coffee leaves—*Moseley*.

Ceylon; Cuba; North America; Tahiti, &c.

DISCOMYCETES.

Geoglossum hirsutum, Pers.

Geoglossum hirsutum, Pers., Comment., p. 37; Cooke, Mycogr., i. t. 1; Berkl., Journ. Linn. Soc. Lond., xv. p. 49.

BERMUDAS.—On dead sphagnum under ferns in Devonshire Marsh—*Moseley*.

The head, as well as the stem, is hispid.

Widely spread in the temperate zone of the northern hemisphere, also in Java, Mauritius, Bourbon, Cuba, and New Zealand.

HYPHOMYCETES.

Sporidesmium antiquum, Corda.

Sporidesmium antiquum, Corda, Ic. Fung., iii. fig. 11, var. *sparsum*, Berkl. in Journ. Linn. Soc. Lond., xv. p. 49.

BERMUDAS.—On dead stems—*Moseley*.

North temperate regions; Bombay.

MYXOMYCETES.

Lycogala epidendrum, Fries.

Lycogala epidendrum, Fries, Syst. Myc., iii. p. 80; Rostaf., Mon., p. 285; Cooke, Myx. Brit., p. 75; Berkl. in Journ. Linn. Soc. Lond., xiv. p. 351.

BERMUDAS.—On fern (*Osmunda*); abundant—*Moseley*.

Widely dispersed in warm and temperate countries, including Australia.

ALGÆ.

MELANOSPERMEÆ.

FUCACEÆ.

Sargassum linifolium, K. A. Agardh.

Sargassum linifolium, K. A. Agardh, Sp. Alg., i. p. 18; Kütz., Sp. Alg., p. 614; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.

BERMUDAS.—*Rein*.

Mediterranean; Adriatic; Senegambia; Mauritius.

Sargassum bacciferum, K. A. Agardh.

Sargassum bacciferum, K. A. Agardh, Sp. Alg., i. p. 6; Harv., Nereis Bor.-Am., i. p. 59; Kütz., Sp. Alg., p. 609; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.

BERMUDAS. *Kemp; Rein; Captain Ker*, 1799.

Generally diffused.

Sargassum vulgare, K. A. Agardh.

Sargassum vulgare, K. A. Agardh, Sp. Alg., i. p. 3, quoad α, β, et δ; Harv., Nereis Bor.-Am., i. p. 57; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.
Sargassum boryanum, Mont., Fl. Alg., i. p. 45, t. 1, fig. 3, et Syll. Gen. et Sp. Crypt., p. 385.

BERMUDAS. *Rein.*

Very widely diffused.

Sargassum affine, J. G. Agardh.

Sargassum affine, J. G. Agardh, ex Kütz., Sp. Alg., p. 610; Harv., Nereis Bor.-Am., i. 59; Dickie in Journ. Linn. Soc. Lond., xv. p. 488.

BERMUDAS. *Moseley; Rein.*

Eastern Mexico; Brazil; Canaries; Cape of Good Hope.

Sargassum lendigerum, K. A. Agardh.

Sargassum lendigerum, K. A. Agardh, Sp. Alg., i. p. 9; Kütz., Sp. Alg., p. 612; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.

BERMUDAS. *Rein.*

Originally described from specimens from the coast of Ascension Island.

SPOROCHNACEÆ.

Sporochnus pedunculatus, K. A. Agardh.

Sporochnus pedunculatus, K. A. Agardh, Sp. Alg., p. 149; Kütz., Sp. Alg., p. 568; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Shores of Western Europe, the Adriatic, and a variety on the coast of South Australia.

DICTYOTACEÆ.

Haliseris justii, K. A. Agardh.

Haliseris justii, K. A. Agardh, Sp. Alg., i. p. 142; Kütz., Sp. Alg., p. 562; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.
Dictyopteris justii, Lamour., extr. Journ. Philom., p. 18, t. 6.

BERMUDAS. *Moseley.*

All dredged in thirty-one fathoms; very dwarfed, and denticulate with one exception; in other general characters and colour similar to specimens from shallow water.

West Indies and South America.

Haliseris plagiogramma, Mont.

Haliseris plagiogramma, Mont., Cuba, p. 63, t. 3, fig. 3, et Syll. Pl. Crypt., p. 397; Kütz., Sp. Alg., p. 562; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.

BERMUDAS. *Rein.*

Cuba; Fernando-Noronha; Brazil.

Haliseris polypodioides, K. A. Agardh.

Haliseris polypodioides, K. A. Agardh, Sp. Alg., i. p. 142; Harv., Nereis Bor.-Am., i. p. 101; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.

BERMUDAS. *Kemp; Rein.*

Widely spread in the North Atlantic, and entering the British Channel; also in the Mediterranean and on the eastern coast of Australia.

Padina pavonia, Gaill.

Padina pavonia, Gaill., Résum., p. 24; Harv., Phyc. Brit., t. 91, et Nereis Bor.-Am., i. p. 104; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.

Zonaria pavonia, K. A. Agardh, Sp. Alg., i. p. 125; Kütz., Sp. Alg., p. 565.

BERMUDAS. *Moseley; Kemp; Rein.*

Generally spread.

Zonaria lobata, K. A. Agardh.

Zonaria lobata, K. A. Agardh, Syst. Alg., p. 265; Harv., Nereis Bor.-Am., i. p. 105; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.

Stypodium fuliginosum, Kütz., Sp. Alg., p. 563.

BERMUDAS.—Shallows only—*Moseley; Kemp; Rein.*

Atlantic and Pacific Oceans, on the shores of the Canaries and America; also of New Zealand and Ceylon.

Zonaria variegata, K. A. Agardh.

Zonaria variegata, K. A. Agardh, Sp. Alg., i. p. 127; Harv., Nereis Bor.-Am., i. p. 106; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.

Spatoglossum variegatum, Kütz., Sp. Alg., p. 560.

Dictyota variegata, Lamour. in Journ. de Bot., Paris, 1809, ii. p. 40.

BERMUDAS.—Shallows, and many from thirty-one fathoms; the former olive, the latter mostly bluish green in colour, and rather thinner in texture than usual—*Moseley; Kemp.*

West Indies; South America; Australia; Polynesia; Mauritius.

Taonia schrœderi, Mert.

Taonia schrœderi, Mert. ex J. G. Agardh, Sp. Alg., i. p. 102; Harv., Nereis Bor.-Am., i. p. 107.

BERMUDAS. *Farlow.*

West Indies; Brazil; India; Ceylon.

Dictyota ciliata, J. G. Agardh.

Dictyota ciliata, J. G. Agardh in Linnæa, 1841, p. 5; Kütz., Sp. Alg., p. 556, non Lamour. in Journ. de Bot. Paris, 1809, ii. p. 41; Harv., Nereis Bor.-Am., i. p. 110; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.

BERMUDAS. *Kemp; Rein.*

Florida; West Indies; Brazil; Australia; Ceylon.

Dictyota bartayresiana, Lamour.

Dictyota bartayresiana, Lamour. in Journ. de Bot. Paris, 1809, ii. p. 43; Kütz., Sp. Alg., p. 554; Harv., Nereis Bor.-Am., i. p. 110; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.

BERMUDAS.—Shallows only—*Moseley*

"Small and rather imperfect, but, I think, may be referred to this species."—*Dickie.*

Florida, West Indies, shores of the Atlantic Islands, the Persian Gulf, and Mauritius.

Dictyota ligulata, Kütz.

Dictyota ligulata, Kütz. in Bot. Zeit., 1847, p. 53, et Sp. Alg., p. 554; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.

BERMUDAS.—From thirty-one fathoms—*Moseley.*

Mediterranean.

Dictyota dichotoma, Lamour.

Dictyota dichotoma, Lamour. in Journ. de Bot. Paris, 1809, ii. p. 42; Kütz., Sp. Alg., p. 554; Harv., Nereis Bor.-Am., i. p. 109; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.
Ulva dichotoma, Huds., Fl. Angl., ed. 1, p. 476.

BERMUDAS.—Some from thirty-one fathoms seem to be dwarf forms of this species—*Moseley; Kemp; Rein.*

Very widely diffused.

Dictyota crenulata, J. G. Agardh.

Dictyota crenulata, J. G. Agardh, Fucoid., p. 94; Kütz., Sp. Alg., p. 558; Harv., Nereis Bor.-Am., i. p. 111; Kemp. in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Eastern coast of Mexico.

Dictyota fasciola, Lamour.

Dictyota fasciola, Lamour. in Journ. de Bot. Paris, 1809, ii. p. 43; Kütz., Sp. Alg., p. 555; Harv., Nereis Bor.-Am., i. p. 108; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 151.
Zonaria fasciola, K. A. Agardh, Sp. Alg., i. p. 136.

BERMUDAS. *Rein.*

Florida; Mediterranean; Red Sea; Ceylon.

Asperococcus sinuosus, Bory.

Asperococcus sinuosus, Bory, Morée, iii. p. 326, ex J. G. Agardh, Sp. Alg., i. p. 75; Harv., Nereis Bor.-Am., i. p. 117; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.
Encœlium sinuosum, K. A. Agardh, Sp. Alg., p. 146; Kütz., Sp. Alg., p. 552.

BERMUDAS.—In shallow water—*Moseley; Kemp; Rein.*

Widely diffused, though we have seen no specimens from Polynesia or Western America, except from Juan Fernandez and the extreme northwest.

CHORDARIACEÆ.

Mesogloia vermicularis, K. A. Agardh.

Mesogloia vermicularis, K. A. Agardh, Syst. Alg., p. 51; Kütz., Sp. Alg., p. 544; Harv., Nereis Bor.-Am. i. p. 126; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Kemp; Rein.*

Western Europe; Mediterranean.

Mesogloia griffithsiana, Grev.

Mesogloia griffithsiana, Grev.; Kütz., Sp. Alg., p. 545; Harv., Nereis Bor.-Am., i. p. 127; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Coast of England; Heligoland.

Perhaps an error in determination, or the specimen from some other locality.

Mesogloia virescens, Carm.

Mesogloia virescens, Carm.; Hook., Br. Fl., ii. p. 387, ex Kütz., Sp. Alg., p. 545; Harv., Nereis Bor.-Am., i. p. 126; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.

BERMUDAS.—Shallows only—*Moseley; Kemp.*

Western Europe; eastern North America; Australasia.

RHODOSPERMEÆ.

RHODOMELACEÆ.

Acanthophora thierii, Lamour.

Acanthophora thierii, Lamour., Ess., p. 44; Kütz., Sp. Alg., p. 858; Harv., Nereis Bor.-Am., ii. p. 17, t. 14, A.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Kemp; Rein.*

Florida; West Indies; Fernando-Noronha; Polynesia; Mauritius, &c.

Chondria littoralis, Harv.

Chondria littoralis, Harv., Nereis Bor.-Am., ii. p. 22; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein.*

Key West, Florida.

Alsidium blodgettii, Harv.

Alsidium blodgettii, Harv., Nereis Bor.-Am., ii. p. 16, t. 15, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am. M., 1873, p. 152.

BERMUDAS. *Rein.*

Florida.

Digenia simplex, K. A. Agardh.

Digenia simplex, K. A. Agardh, Sp. Alg., i. p. 389; Harv., Nereis Bor.-Am., ii. p. 30; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.
Digenea wulfeni, Kütz., Sp. Alg., p. 841.

BERMUDAS. *Kemp; Rein.*

Mediterranean and Red Seas; Mauritius; Rodriguez; eastern North America.

Polysiphonia secunda, Mont.

Polysiphonia secunda, Mont., Cuba, p. 33, t. 5, fig. 2, et Syll. Gen. et Sp. Crypt., p. 424; Kütz., Sp. Alg., p. 804; Harv., Nereis Bor.-Am., ii. p. 35.
Polysiphonia pecten-veneris, Harv., Nereis Bor.-Am., iii. p. 46, ex Farlow.

BERMUDAS. *Farlow.*

Florida Keys; West Indies; Mediterranean; Mauritius; Ceylon.

Polysiphonia subtilissima, Mont.

Polysiphonia subtilissima, Mont., Cent., ii. n. 6, et Syll. Gen. et Sp. Crypt., p. 422; Kütz., Sp. Alg., p. 804; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314; Harv., Nereis Bor.-Am., ii. p. 34.

BERMUDAS.—Shallow lagoons—*Moseley.*

Eastern North America; Cayenne.

Polysiphonia exilis, Harv.

Polysiphonia exilis, Harv., Nereis Bor.-Am., ii. p. 47; Dickie in Journ. Linn. Soc. Lond., xiv. p. 313.

BERMUDAS.—Shallow lagoons—*Moseley*.

Key West, Florida.

Polysiphonia nigrescens, Grev.

Polysiphonia nigrescens, Grev.; Harv., Nereis Bor.-Am., ii. p. 49; Kütz., Sp. Alg., p. 813; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein*.

Northern and Western Europe; eastern North America; New Zealand.

Polysiphonia fibrillosa, Grev.

Polysiphonia fibrillosa, Grev.; J. G. Agardh, Sp. Alg., ii. p. 991; Harv., Nereis Bor.-Am., ii. p. 43; Kütz., Sp. Alg., p. 827; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Kemp; Rein*.

Western Europe; eastern North America.

Polysiphonia elongata, Grev.

Polysiphonia elongata, Grev.; J. G. Agardh, Sp. Alg., ii. p. 1004; Harv., Nereis Bor.-Am., ii. p. 42; Kütz., Sp. Alg., p. 828; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp*.

Shores of the North Atlantic, Mediterranean, Adriatic, and Black Seas.

Bostrychia calamistrata, Mont.

Bostrychia calamistrata, Mont., Syll. Gen. et Sp. Crypt., p. 419; Kütz., Sp. Alg., p. 839; Harv. Nereis Bor.-Am., ii. p. 56, t. 14, C.

Rhodomela calamistrata, Mont., Cuba, p. 36, t. 4, fig. 1.

BERMUDAS. *Farlow*.

West Indies.

Bostrychia sertularia, Mont.

Bostrychia sertularia, Mont. in Ann. Sc. Nat., sér. 4, xii. p. 176.

BERMUDAS. *Farlow*.

Guiana.

Bostrychia montagnei, Harv.

Bostrychia montagnei, Harv., Nereis Bor.-Am., ii. p. 55, t. 14, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein; Farlow*.

Key West, Florida.

It is probable that the alga named *Bostrychia scorpioides*, Mont., by Kemp, is this species.

Dasya elegans, K. A. Agardh.

Dasya elegans, K. A. Agardh, Sp. Alg., ii. p. 117; Kütz., Sp. Alg., p. 796; Harv., Nereis Bor.-Am., ii. p. 60; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein.*

Adriatic; Canaries; and common on the eastern coast of North America.

Dasya tumanowiczii, Gatty.

Dasya tumanowiczii, Gatty; Harv., Nereis Bor.-Am., ii. p. 64; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS.—In shallow lagoons—*Moseley.*

Florida; West Indies; Brazil.

Dasya mucronata, Harv.

Dasya mucronata, Harv., Nereis Bor.-Am., ii. p. 63; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Key West, Florida.

LAURENCIACEÆ.

Laurencia obtusa, Lamour.

Laurencia obtusa, Lamour., Ess., p. 42; Kütz., Sp. Alg., p. 854; Harv., Phyc. Brit., t. 148, et Nereis Bor.-Am., ii. p. 72; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS. *Moseley; Kemp; Rein.*

A very widely dispersed species.

Laurencia gemmifera, Harv.

Laurencia gemmifera, Harv., Nereis Bor.-Am., ii. p. 73, t. 18, B.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS.—Shallow water—*Moseley; Rein.*

Florida Keys.

Laurencia papillosa, Grev.

Laurencia papillosa, Grev.; J. G. Agardh, Sp. Alg., ii. p. 756; Kütz., Sp. Alg., p. 855; Harv., Nereis Bor.-Am., p. 74; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Kemp; Rein.*

Widely diffused in the Atlantic, Pacific, and Indian Oceans, and in the Mediterranean and Red Seas, &c.

The alga identified by Kemp as *Laurencia scoparia*, J. G. Agardh, may be the same as this.

Asparagopsis delilei, Mont.

Asparagopsis delilei, Mont., Syll. Gen. et Sp. Crypt., p. 428; Kütz., Sp. Alg., p. 802; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.
Dasya delilei, Mont., Canar., p. 166, t. 8, fig. 6.

BERMUDAS. *Rein.*

Canaries; Mauritius; Philippines; South Australia.

WRANGELIACEÆ.

Wrangelia penicillata, K. A. Agardh.

Wrangelia penicillata, K. A. Agardh, Sp. Alg., ii. p. 138; J. G. Agardh, Sp. Alg., ii. p. 708; Harv., Nereis Bor.-Am., ii. p. 143, t. 34, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Kemp; Rein.*

Mediterranean; Adriatic; Florida; West Australia.

CORALLINACEÆ.

Jania cubensis, Mont.

Jania cubensis, Mont. in Kütz. Sp. Alg., p. 709, et Syll. Gen. et Sp. Crypt., p. 429; Harv., Nereis Bor.-Am., ii. p. 84; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., p. 152.

BERMUDAS. *Rein.*

Florida; Cuba; Fernando-Noronha; Cape Verde Islands.

Amphiroa fragilissima, Lamour.

Amphiroa fragilissima, Lamour., Polyp. Flex., p. 298, ex Kütz., Sp. Alg., p. 700; Harv., Nereis Bor.-Am., ii. p. 85; Dickie in Journ. Linn. Soc. Lond., xv. p. 488.

BERMUDAS. *Moseley.*

Florida Keys; West Indies; Cape Verde Islands; St Helena; Ceylon; Mauritius; Philippines; Admiralty Islands; Pacific coast of South America.

Farlow (Alg. Exsic. Am.-Bor., n. 15) refers *Amphiroa decipiens*, Kütz., not of Harv., Nereis, to this species.

Amphiroa debilis, Kütz.

Amphiroa debilis, Kütz., Sp. Alg., p. 700; Harv., Nereis Bor.-Am., ii. p. 86; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein.*

Florida Keys; Cuba.

Melobesia pustulata, Lamour.

Melobesia pustulata, Lamour., Polyp. Flex., p. 315, t. 12; Kütz., Sp. Alg., p. 696; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS.—From thirty-one fathoms, on various algæ—*Moseley.*

Widely spread in the Atlantic and Mediterranean, and in the Southern Ocean.

Melobesia agariciformis, Harv.

Melobesia agariciformis, Harv., Phyc. Brit., t. 73.
Spongites agariciformis, Kütz., Sp. Alg., p. 698.

BERMUDAS. *Lefroy.*

Eastern North Atlantic; Mediterranean.

SPHÆROCOCCOIDEÆ.

Botryoglossum platycarpum, Kütz.

Botryoglossum platycarpum, Kütz., Sp. Alg., p. 881; Harv., Nereis Bor.-Am., ii. p. 100, t. 21, A.; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

California; Falkland Islands; Cape of Good Hope; Heard Island.

As neither Rein nor Moseley collected this alga in the Bermudas, and as there is no other record of it from the Atlantic, there may be an error in Kemp's naming.

Gracilaria confervoides, Grev.

Gracilaria confervoides, Grev., Alg. Brit., p. 123; J. G. Agardh, Sp. Alg., ii. p. 587; Harv., Nereis Bor.-Am., ii. p. 108; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS. *Moseley; Kemp.*

Ubiquitous.

Gracilaria armata, J. G. Agardh.

Gracilaria armata, J. G. Agardh, Sp. Alg., ii. p. 591; Kütz., Sp. Alg., p. 774; Harv., Nereis Bor.-Am., ii. p. 109; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Kemp; Rein.*

Mediterranean; Florida; Fernando-Noronha.

Gracilaria cervicornis, J. G. Agardh.

Gracilaria cervicornis, J. G. Agardh, Sp. Alg., ii. p. 604; Harv., Nereis Bor.-Am., ii. p. 107; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

Bermudas.—One dwarf specimen from thirty-one fathoms—*Moseley*.

West Indies; Mexico; eastern South America.

Gracilaria poitei, Lamour.

Gracilaria poitei, Lamour., Diss., p. 63; J. G. Agardh, Sp. Alg., ii. p. 596; Harv., Nereis Bor.-Am., ii. p. 110; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

Bermudas.—Shallows—*Moseley*.

Florida; West Indies; eastern South America; Ceylon.

Gracilaria ferox, J. G. Agardh.

Gracilaria ferox, J. G. Agardh, Sp. Alg., ii. p. 592; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

Bermudas.—From shallows—*Moseley*.

West Indies.

Gracilaria divaricata, Harv.

Gracilaria divaricata, Harv., Nereis Bor.-Am., ii. p. 109; Kemp. in Canad. Nat. and Geol., May 1857.

Bermudas. *Kemp*.

Florida.

Gracilaria multipartita, Harv.

Gracilaria multipartita, Harv., Phyc. Brit., t. 15; J. G. Agardh, Sp. Alg., ii. p. 600; Harv., Nereis Bor.-Am., ii. p. 107; Kemp. in Canad. Nat. and Geol., May 1857.

Bermudas. *Kemp*.

A very widely diffused species.

Gelidiaceæ.

Gelidium rigidum, Mont.

Gelidium rigidum, Mont., Cuba, p. 46, ex Kütz., Sp. Alg., p. 766; J. G. Agardh, Sp. Alg., ii. p. 468; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

Bermudas. *Rein*.

West Indies; Brazil; Polynesia; Indian Ocean; Red Sea, &c.

Gelidium corneum, Lamour.

Gelidium corneum, Lamour., Ess., p. 41; Kütz., Sp. Alg., p. 764; J. G. Agardh, Sp. Alg., ii. p. 469; Harv., Phyc. Brit., t. 53; Harv., Nereis Bor.-Am., ii. p. 116; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Generally diffused.

Wurdemannia setacea, Harv.

Wurdemannia setacea, Harv., Nereis Bor.-Am. ii., p. 246; Kütz., Tab. Phyc., xix. t. 26; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein.*

Florida Keys.

Hypnea musciformis, Lamour.

Hypnea musciformis, Lamour., Ess., p. 43; J. G. Agardh, Sp. Alg., ii. p. 442; Kütz., Sp. Alg., p. 758; Harv., Nereis Bor.-Am., ii. p. 123; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Kemp; Rein.*

Mediterranean; Atlantic; Indian Ocean; Australasia, &c.

Hypnea cornuta, Lamour.

Hypnea cornuta, Lamour., ex J. G. Agardh, Sp. Alg., ii. p. 449; Harv., Nereis Bor.-Am., ii. p. 125; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS.—From shallows and from thirty-one fathoms—*Moseley.*

Florida; West Indies; Guiana; Manilla; Ceylon; Mauritius.

Eucheuma isiforme, J. G. Agardh.

Eucheuma isiforme, J. G. Agardh, Sp. Alg., ii. p. 627; Harv., Nereis Bor.-Am., ii. p. 118; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS. *Moseley; Kemp; Rein.*

Florida; West Indies.

SQUAMARIEÆ.

Peyssonelia dubyi, Crouan.

Peyssonelia dubyi, Crouan in Ann. Sc. Nat., 1844, p. 368, t. 11, B.; Harv., Phyc. Brit., t. 71, et Nereis Bor.-Am., ii. p. 130; Kütz., Sp. Alg., p. 694; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS.—From thirty-one fathoms—*Moseley.*

Coast of Britain and Northern France; Cape Verde Islands; Florida.

HELMINTHOCLADEÆ.

Liagora valida, Harv.

Liagora valida, Harv., Nereis Bor.-Am., ii. p. 138, t. 31, A.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 314.

BERMUDAS. In shallows—*Moseley; Kemp; Rein.*

Florida Keys.

The plant named *Liagora pulverulenta* by Kemp may be the same as this.

Galaxaura fastigiata, Dene.

Galaxaura fastigiata, Dene.; Kütz., Sp. Alg., p. 530; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein.*

Philippines.

We include this entirely on Rein's authority, having seen only Cuming's specimens from the Philippines.

Galaxaura lapidescens, Lamour.

Galaxaura lapidescens, Lamour., Polyp. Flex., p. 264; Kütz., Sp. Alg., p. 530; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—From thirty fathoms—*Moseley.*

Cape Verde and Canary Islands; St Helena; Florida; Sandwich Islands; Polynesia; Mauritius.

Galaxaura rugosa, Lamour.

Galaxaura rugosa, Lamour., Polyp. Flex., p. 263; Kütz., Sp. Alg., p. 530; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—From shallows, and also from thirty-one fathoms—*Moseley.*

Cape Verde Islands; West Indies; Mauritius.

Scinaia furcellata, Bivona.

Scinaia furcellata, Bivona in L'Iride, Palermo, 1822, cum icone; J. G. Agardh, Sp. Alg., ii. p. 422; Harv., Nereis Bor.-Am., ii. p. 136; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—A solitary and imperfect specimen from thirty-one fathoms—*Moseley.*

Widely diffused.

Helminthora divaricata, J. G. Agardh.

Helminthora divaricata, J. G. Agardh, Sp. Alg., ii. p. 416; Harv., Nereis Bor.-Am., ii. p. 133; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Florida; Western Europe; Mediterranean; Australasia.

RHODYMENIACEÆ.

Rhodymenia palmata, Grev.

Rhodymenia palmata, Grev.; Harv., Phyc. Brit., tt. 217 et 218, et Nereis Bor.-Am., ii. p. 148; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

A common and widely dispersed species; yet neither this nor the next was collected in the Bermudas by either Rein or Moseley.

SPYRIDIACEÆ.

Spyridia aculeata, Kütz.

Spyridia aculeata, Kütz., Sp. Alg., p. 668 (excl. synon.), ex Harv., Nereis Bor.-Am., ii. p. 205; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Florida Keys; Cadiz; Cape Verde Islands; Mediterranean; Red Sea.

Spyridia filamentosa, Harv.

Spyridia filamentosa, Harv., Nereis Bor.-Am., ii. p. 204, t. 34, A.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein.*

Eastern North America, from Massachusetts to Florida.

CRYPTONEMIACEÆ.

Callophyllis laciniata, Kütz.

Callophyllis laciniata, Kütz., Sp. Alg., p. 744; Harv., Nereis Bor.-Am., ii. p. 171.
Rhodymenia laciniata, Grev.; Harv., Phyc. Brit., t. 121; Kemp. in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Western Europe; Mediterranean; California; Cape Heulopen, eastern North America.

Kallymenia reniformis, J. G. Agardh.

Kallymenia reniformis, J. G. Agardh., Sp. Alg., ii. p. 286? Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—A few very fragmentary specimens from thirty-one fathoms—*Moseley.*

The typical plant inhabits the shores of Western Europe.

Gigartina teedii, Roth.

Gigartina teedii, Roth, Cat., iii. p. 108; J. G. Agardh, Sp. Alg., ii. p. 266; Kemp. in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Western Europe; Mediterranean; Adriatic; Cape Verde Islands; Brazil.

Chondrus crispus, Lyngb.

Chondrus crispus, Lyngb., Hydr., p. 15, t. 5; J. G. Agardh, Sp. Alg., ii. p. 246; Harv., Nereis Bor.-Am., ii. p. 181; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Coast of Western Europe and eastern North America, "from the shores of British America to those of Long Island"—*Harvey.*

As neither Rein nor Moseley collected this distinct alga, and as there is no other record of it so far south on the American side of the Atlantic, there is some reason for doubting the Bermudan origin of Kemp's specimen.

Cryptonemia crenulata, J. G. Agardh.

Cryptonemia crenulata, J. G. Agardh, Sp. Alg., ii. p. 225; Harv., Nereis Bor.-Am., ii. p. 184; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.
Phyllophora crenulata, J. G. Agardh, Symb., i. p. 18; Kütz., Sp. Alg., p. 791.

BERMUDAS. *Rein.*

Florida; Brazil.

Chrysymenia uvaria, J. G. Agardh.

Chrysymenia uvaria, J. G. Agardh, Sp. Alg., ii. p. 214; Harv., Nereis Bor.-Am., ii. p. 191, t. 20, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.
Gastroclonium uvaria, Kütz., Sp. Alg., p. 865.

BERMUDAS. *Kemp; Rein; Farlow.*

Florida; Mediterranean; Australia; Philippines.

Chrysymenia agardhii, Harv.

Chrysymenia agardhii, Harv., Nereis Bor.-Am., ii. p. 189, t. 30, A.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—A very dwarf and matted variety from shallow water—*Moseley.*

Florida Keys.

Chrysymenia halymenioides, Harv.

Chrysymenia halymenioides, Harv., Nereis Bor.-Am., ii. p. 188, t. 20, A.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—A single very small example one inch high—*Moseley.*

Florida Keys.

Harvey states that this is very closely allied to the next.

Chrysymenia dichotoma, J. G. Agardh?

Chrysymenia dichotoma, J. G. Agardh, Sp. Alg., ii. p. 211; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315; Harv., Nereis Bor.-Am., ii. p. 189.

BERMUDAS.—From thirty-one fathoms—*Moseley.*

Adriatic; Mediterranean; Teneriffe.

Chylocladia rosea, Harv.

Chylocladia rosea, Harv., Phyc. Brit., t. 301, et Nereis Bor.-Am., p. 186; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Eastern coast of North America and Western Europe.

We have seen no specimens from the American side of the Atlantic farther south than Rhode Island.

Catenella pinnata, Harv.

Catenella pinnata, Harv., Nereis Bor.-Am., ii. p. 201, t. 29, B.

BERMUDAS. *Farlow.*

Florida Keys.

Gloiosiphonia capillaris, Carm.

Gloiosiphonia capillaris, Carm.; J. G. Agardh, Sp. Alg., ii. p. 161; Harv., Nereis Bor.-Am. ii. p. 202; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Western Europe from Norway to Spain; eastern North America, on the coast of New England; Vancouver Island, Pacific.

CERAMIACEÆ.

Centroceras clavulatum, J. G. Agardh.

Centroceras clavulatum, J. G. Agardh, Sp. Alg., ii. p. 148; Harv., Nereis Bor.-Am., ii. p. 211, t. 33, C.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—Shallow water—*Moseley; Rein.*

Generally diffused in tropical and subtropical seas, and extending into the south temperate zone.

Centroceras cryptacanthum, Kütz.

Centroceras cryptacanthum, Kütz. in Linnæa, 1842, p. 741, et Sp. Alg., p. 688; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—Shallow water—*Moseley*.

West Indies; Cape Verde Islands; Brazil; Falkland Islands; Valparaiso.

Ceramium nitens, J. G. Agardh.

Ceramium nitens, J. G. Agardh, Sp. Alg., ii. p. 130; Harv., Nereis Bor.-Am., ii. p. 213; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 152.

BERMUDAS. *Rein*.

Florida Keys; West Indies.

Ceramium rubrum, J. G. Agardh.

Ceramium rubrum, J. G. Agardh, Sp. Alg., ii. p. 127; Harv., Nereis Bor.-Am., ii. p. 213; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp*.

A very widely dispersed species, including the eastern coast of North America from the Arctic Sea to South Carolina.

Ceramium fastigiatum, Harv.

Ceramium fastigiatum, Harv., Phyc. Brit., t. 255, et Nereis Bor.-Am., ii. p. 217; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp*.

Baltic; Adriatic; Mediterranean; North Atlantic, though not recorded from the coast of the Southern States of North America.

CHLOROSPERMEÆ.

SIPHONACEÆ.

Caulerpa mexicana, Sonder.

Caulerpa mexicana, Sonder, ex Kütz., Sp. Alg., p. 496; Harv., Nereis Bor.-Am., iii. p. 16, t. 37, A.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—From shallows, and also dredged from thirty-one fathoms; specimens from this depth well developed and of the usual colour—*Moseley*; *Rein*.

Florida Keys; West Indies; Mexico; Fernando-Noronha; Cape Verde Islands; Ceylon.

Caulerpa plumaris, K. A. Agardh.

Caulerpa plumaris, K. A. Agardh, Sp. Alg., i. p. 436; Kütz., Sp. Alg., p. 496; Harv., Nereis Bor.-Am., iii. p. 17, t. 38, C.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Kemp; Rein; Farlow.*

Florida Keys, and generally dispersed in warm seas.

Caulerpa clavifera, K. A. Agardh.

Caulerpa clavifera, K. A. Agardh, Sp. Alg., i. p. 437; Harv., Nereis Bor.-Am., iii. p. 19; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.
Chauoinia clavifera, Kütz., Sp. Alg., p. 498.

BERMUDAS.—In lagoons—*Moseley; Rein.*

Also a very widely diffused species.

Caulerpa prolifera, Lamour.

Caulerpa prolifera, Lamour. in Journ. de Bot., Paris, 1809, ii. p. 136; Harv., Nereis Bor.-Am., iii. p. 16, t. 38, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.
Phyllerpa prolifera, Kütz., Sp. Alg., p. 494.

BERMUDAS. *Kemp; Rein.*

Widely distributed in the North Atlantic and Mediterranean.

Caulerpa taxifolia, K. A. Agardh.

Caulerpa taxifolia, K. A. Agardh, Sp. Alg., i. p. 435, cum *β crassifolia*, l. c., p. 436; Kütz., Sp. Alg., p. 495.

BERMUDAS.—Walsingham—*Farlow.*

Widely dispersed in warm seas.

Halimeda incrassata, Lamour.

Halimeda incrassata, Lamour., Exp. Méth., p. 26, ex Kütz., Sp. Alg., p. 504; Harv., Nereis Bor.-Am., iii. p. 24; Dickie in Journ. Linn. Soc. Lond., xv. p. 488; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Moseley; Rein.*

West Indies; Florida Keys; North Australia; Friendly Islands.

Halimeda opuntia, Lamour.

Halimeda opuntia, Lamour., Exp. Méth., p. 27, t. 20, fig. 6; Kütz., Sp. Alg., p. 504; Harv., Nereis Bor.-Am., iii. p. 23, t. 40, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

Florida Keys, and generally diffused in warm seas, especially on insular shores. Thus, Moseley collected it at Fernando-Noronha, at St Thomas, Tongatabu, Admiralty Isles, Philippines, Sandwich Islands, and Tahiti.

Halimeda tuna, Lamour.

Halimeda tuna, Lamour., Exp. Méth., p. 27, ex Kütz., Sp. Alg., p. 504; Harv., Nereis Bor.-Am., iii. p. 25, t. 40, A.; Dickie in Journ. Linn. Soc. Lond., xv. p. 488.

BERMUDAS. *Moseley.*

Florida Keys; Brazil; Mediterranean; Cape Verde Islands; Rodriguez; Ceylon; Philippines; Admiralty Islands.

Udotea conglutinata, Lamour.

Udotea conglutinata, Lamour., Polyp. Flex., p. 312, ex Kütz., Sp. Alg., p. 502; Harv., Nereis Bor.-Am., iii. p. 27, t. 40, C.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—From thirty-one fathoms—*Moseley; Rein.*

Florida Keys; West Indies; Brazil.

Udotea flabellata, Lamour.

Udotea flabellata, Lamour., Polyp. Flex., p. 311, t. 12, fig. 1, ex Kütz., Sp. Alg., p. 502; Harv., Nereis Bor.-Am., iii. p. 26; Dickie in Journ. Linn. Soc. Lond., xv. p. 488; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Moseley; Rein.*

Florida Keys; West Indies; Friendly Islands; North Australia.

Rhipilia longicaulis, Kütz.

Rhipilia longicaulis, Kütz., ex Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—In shallows—*Moseley.*

West Indies; Australia.

Chlorodesmis vaucheriæformis, Bail. et Harv.

Chlorodesmis vaucheriæformis, Bail. et Harv. in Harv. Nereis Bor.-Am., iii. p. 30, t. 40, D.; Dickie in Journ. Linn. Soc. Lond., xv. p. 488.

BERMUDAS. *Moseley.*

Florida Keys; Ceylon.

Codium tomentosum, K. A. Agardh.

Codium tomentosum, K. A. Agardh, Sp. Alg., i. p. 452; Kütz., Sp. Alg., p. 500; Harv., Nereis Bor.-Am., iii. p. 29; Dickie in Journ. Linn. Soc. Lond., xiv. p. 315.

BERMUDAS.—From thirty-one fathoms; large and of the ordinary colour—*Moseley; Kemp; Rein.*

One of the most generally diffused sea-weeds.

Codium adhærens, K. A. Agardh.

Codium adhærens, K. A. Agardh, Sp. Alg., i. p. 457; Kütz., Sp. Alg., p. 502; Kemp in Canad. Nat. and Geol., May 1857.

Codium diforme, Kütz., Phyc. Gener., p. 300; Dickie in Journ. Linn. Soc. Lond., xv. p. 488.

BERMUDAS. *Kemp; Moseley.*

Western Europe; Canaries; Cape Verde Islands; Mediterranean; New Zealand; Mauritius; Rodriguez; Ceylon.

Codium bursa, K. A. Agardh.

Codium bursa, K. A. Agardh, Sp. Alg., i. p. 457; Kütz., Sp. Alg., p. 502; Kemp. in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Western Europe; Mediterranean; Canaries.

We have no other than Kemp's record of this occurring on the western side of the Atlantic.

Bryopsis plumosa, K. A. Agardh.

Bryopsis plumosa, K. A. Agardh, Sp. Alg., i. p. 448; Kütz., Sp. Alg., p. 493; Harv., Nereis Bor.-Am., iii. p. 31, t. 45, A.; Dickie in Journ. Linn. Soc. Lond., xv. p. 488; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Moseley; Kemp.*

Widely diffused, and extending to New Zealand in the south.

Kemp's list includes *Bryopsis hypnoides*, Lamour., which Kützing regards as a variety of *Bryopsis plumosa*.

Bryopsis tenuissima, Moris et De Notaris.

Bryopsis tenuissima, Moris et De Notaris, Fl. Capr., p. 203, ex Kütz., Sp. Alg., p. 490.

Derbesia marina, Solier, Rev. Bot., 1846, p. 452; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

Red Sea; Mediterranean; Adriatic; Faroe Islands; Pacific coast of South America.

DASYCLADEÆ.

Dasycladus occidentalis, Harv.

Dasycladus occidentalis, Harv., Nereis Bor.-Am., iii. p. 38, t. 41, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

Florida Keys.

Acetabularia crenulata, Lamour.

Acetabularia crenulata, Lamour., Polyp. Flex., p. 244, t. 8, fig. 1, ex Kütz., Sp. Alg., p. 510; Harv., Nereis Bor.-Am., iii. p. 40, t. 42, A.; Kemp. in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp; Rein.*

Florida Keys.

Cymopolia barbata, Lamour.

Cymopolia barbata, Lamour., Polyp. Flex., p. 293, ex Kütz., Sp. Alg., p. 511; Harv., Nereis Bor.-Am., iii. p. 36, t. 41, A.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

Florida Keys; West Indies; Canaries.

VALONIACEÆ.

Penicillus capitatus, Lamark.

Penicillus capitatus, Lamark in Ann. Mus., xx. p. 299; Harv., Nereis Bor.-Am., iii. p. 45, t. 43, B.; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153; Dickie in Journ. Linn. Soc. Lond., xv. p. 489.

Corallocephalus penicillus, Kütz., Sp. Alg., p. 505; Harv., Nereis Bor.-Am., iii.

BERMUDAS. *Moseley; Rein.*

Florida Keys.

Penicillus dumetosus, Dcne.

Penicillus dumetosus, Dcne. in Ann. Sc. Nat., xviii. p. 109; Dickie in Journ. Linn. Soc. Lond., xiv. p. 316; Harv., Nereis Bor.-Am., iii. p. 44, t. 43, A.

Corallocephalus dumetosus, Kütz., Sp. Alg., p. 506.

BERMUDAS.—In shallow lagoons—*Moseley.*

Florida Keys; West Indies.

Valonia utricularis, K. A. Agardh.

Valonia utricularis, K. A. Agardh, Sp. Alg., i. p. 431; Kütz., Sp. Alg., p. 507.

BERMUDAS. *Farlow.*

Mediterranean; Adriatic; Atlantic coast of Spain; Ceylon; Philippines; Tongatabu.

Blodgettia confervoides, Harv.

Blodgettia confervoides, Harv., Nereis Bor.-Am., iii. p. 48, t. 45, C.; Perc. Wright in Trans. Roy. Irish Acad., 1881, t. 2; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

Florida Keys.

Anadyomene flabellata, Lamour.

Anadyomene flabellata, Lamour., Polyp. Flex., p. 365, t. 14, fig. 3, ex Kütz., Sp. Alg., p. 511; Harv., Nereis Bor.-Am., iii. p. 49, t. 44, A.; Dickie in Journ. Linn. Soc. Lond., xv. p. 489.

BERMUDAS. *Moseley; Rein; Farlow.*

Mediterranean; Adriatic; West Indies; Brazil; Ceylon; Philippines.

Struvea ramosa, n. sp.

Struvea ramosa, n. sp., Dickie in Journ. Linn. Soc. Lond., xiv. p. 316.

Stipes sursum opposite ramosus, flabellis subellipticis; filis anastomosantibus tripinnatis, articulis inferioribus pinnarum 7–8 plo, superioribus 3–4 plo, diametro longioribus.

"The only two species hitherto described (and both figured in the Phycologia Australis, vol. i.), have each but one flabellum; the present has a repetition of such. I believe it must be referred to the genus, the stipes being unicellular and monosiphonous, with transverse rugæ and thin reddish calcareous coat at the lower part."—*Dickie.*

BERMUDAS.—From thirty-one fathoms—*Moseley.*

ULVACEÆ.

Porphyra vulgaris, K. A. Agardh.

Porphyra vulgaris, K. A. Agardh, ex Kütz., Sp. Alg., p. 692; Harv., Phyc. Brit., t. 211, et Nereis Bor.-Am., iii. p. 53; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Generally diffused.

Enteromorpha compressa, Grev.

Enteromorpha compressa, Grev., Alg. Brit., p. 180; Kütz., Sp. Alg., p. 480; Harv., Nereis Bor.-Am., iii. p. 57; Dickie in Journ. Linn. Soc. Lond., xiv. p. 316.

BERMUDAS.—In shallows—*Moseley; Rein.*

One of the commoner and generally diffused algæ.

Enteromorpha clathrata, Grev.

Enteromorpha clathrata, Grev., Alg. Brit., p. 181; Kütz., Sp. Alg., p. 479; Harv., Nereis Bor.-Am., iii. p. 57; Kemp in Canad. Nat. and Geol., May 1857.

BERMUDAS. *Kemp.*

Widely dispersed in the Atlantic; also on the coast of New Zealand.

Enteromorpha percursa, J. G. Agardh.

Enteromorpha percursa, J. G. Agardh, Alg. Med., p. 15; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

Schizogonium percursum, Kütz., Sp. Alg., p. 351.

BERMUDAS. *Rein.*

Atlantic and Baltic.

Ulva lactuca, Linn.

Ulva lactuca, Linn.; Kütz., Sp. Alg., p. 474; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Kemp; Rein.*

Mediterranean; eastern Atlantic, from Britain to the Cape of Good Hope; Mauritius; China.

Ulva latissima, Kütz.

Ulva latissima, Kütz., Phyc. Germ., p. 244, t. 20, fig. 4, et Sp. Alg., p. 474; Harv., Nereis Bor.-Am., iii. p. 59; Dickie in Journ. Linn. Soc. Lond., xv. p. 489.

BERMUDAS. *Moseley; Kemp; Rein.*

Generally diffused.

Monostroma orbiculatum, Thuret.

Monostroma orbiculatum, Thuret, ex Farl., Alg. Exsic. Am. Bor., n. 173.

BERMUDAS. *Farlow.*

Phycoseris linza, Kütz.

Phycoseris linza, Kütz., Phyc. Gener., p. 296, et Sp. Alg., p. 475; Harv., Nereis Bor.-Am., iii. p. 59; Kemp in Canad. Nat. and Geol., May 1857 (*Ulva linza*, Linn.)

BERMUDAS. *Kemp; Rein.*

Very widely spread.

CONFERVACEÆ.

Cladophora glaucescens, Kütz.

Cladophora glaucescens, Kütz., Sp. Alg., p. 403; Harv., Nereis Bor.-Am., iii. p. 77; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

North Sea; North Atlantic; Mauritius; North Pacific.

Cladophora lætevirens, Kütz.

Cladophora lætevirens, Kütz., Phyc. Germ., p. 214, et Sp. Alg., p. 400; Harv., Nereis Bor.-Am., iii. p. 82; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

Baltic; North Sea; Cherbourg; Mediterranean; Vancouver Island.

Cladophora luteola, Harv.

Cladophora luteola, Harv., Nereis Bor.-Am., iii. p. 81; Dickie in Journ. Linn. Soc. Lond., xiv. p. 316.

BERMUDAS. *Moseley; Rein.*

The identity of Moseley's specimens with this species is somewhat doubtful.

Cladophora lutescens, Kütz.

Cladophora lutescens, Kütz., Phyc. Germ., p. 211, et Sp. Alg., p. 403; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

North Sea; eastern North Atlantic; Mediterranean.

Cladophora prolifera, Kütz.

Cladophora prolifera, Kütz., Phyc. Germ., p. 207, et Sp. Alg., p. 390; Dickie in Journ. Linn. Soc. Lond., xiv. p. 316.

BERMUDAS. *Moseley.*

Mediterranean; eastern North Atlantic; Brazil; Peru; Bombay; Polynesia.

Hormotrichum bermudianum, Harv.

Hormotrichum bermudianum, Harv., sp. n., ex Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153 (*absque descriptione*).

BERMUDAS. *Rein.*

We have seen no specimen of this species.

Chætomorpha ærea, Kütz.

Chætomorpha ærea, Kütz., Sp. Alg., p. 379; Harv., Nereis Bor.-Am., iii. p. 86; Dickie in Journ. Linn. Soc. Lond., xiv. p. 316.
Conferva ærea, Dillw., t. 80; Harv., Phyc. Brit., t. 99.

BERMUDAS.—In shallow water—*Moseley.*

Widely spread.

Chætomorpha geniculata, Mont.

Chætomorpha geniculata, Mont., Syll. Gen. et Sp. Crypt., p. 460; Rein in Bericht Senckenb. Naturf. Gesellsch., Frankf. am M., 1873, p. 153.

BERMUDAS. *Rein.*

West Indies.

OSCILLATORIACEÆ.

Lyngbya majuscula, Harv.

Lyngbya majuscula, Harv., Man., p. 160, et Nereis Bor.-Am., iii. p. 101, t. 47, A.; Kütz., Sp. Alg., p. 283; Dickie in Journ. Linn. Soc. Lond., xv. p. 489.

BERMUDAS. *Moseley; Rein.*

Florida Keys; West Indies; eastern coast of the North Atlantic; Ceylon; Polynesia; Mauritius.

CHARACEÆ.

Chara gymnopus, A. Braun.

Chara gymnopus, A. Braun, Schweiz. Char., 1849, p. 13, et Fragm. Monogr. Char., ed. Nordst., p. 189.

BERMUDAS.—In pools—*Lefroy; Farlow.*

As limited by Braun, this is an exceedingly variable and widely dispersed species.

ADDENDA.

SINCE the foregoing Report was printed, we have received a copy of General Sir John Henry Lefroy's The Botany of Bermuda, from Bulletin No. 25 of the United States National Museum. This little work was mainly compiled from materials placed at our disposal by the author; but it contains a few additional species, named by various botanists, and further particulars as to the localities of a number of the indigenous ones. Unfortunately, the editing leaves much to be desired, the same plant, in several instances, being repeated under different synonyms; others, by some slip, appear under false generic names, and some are enumerated under wrong natural orders. Nevertheless, we are able to make a few useful extracts concerning some of the probably indigenous plants. Additional species are printed in black type, with references to descriptions as in the body of the Report.

MALVACEÆ.

Hibiscus tiliaceus, Linn. Known to have been raised about fifty years ago from seed washed on shore.

RUTACEÆ.

Zanthoxylum aromaticum, Willd. ?

* *Zanthoxylum aromaticum*, Willd. ? Griseb., Fl. Brit. W. Ind., p. 138.

Sir J. H. Lefroy thinks that a single tree of this or an allied species existing on a hill east of Paynter's Vale may be a survivor of the "Yellow Wood" frequently mentioned in the early records, where it is described as having leaves and rough bark like the walnut tree, and very pungent in taste. We had found no reference to this tree. Professor Oliver, to whom Sir J. H. Lefroy sent leaves, could not determine the species with certainty.

CELASTRINEÆ.

Myginda rhacoma, Swartz.

Myginda rhacoma, Swartz; Griseb., Fl. Brit. W. Ind., p. 146; Chapman, Fl. Southern U.S., p. 75.

Southampton parish. A berry-bearing shrub inhabiting Florida and the West Indies.

LEGUMINOSÆ.

Guilandina bonducella, Linn.

Guilandina bonducella, Linn.; Griseb., Fl. Brit. W. Ind., p. 204.

"Native, but only once found in Walsingham tract." A common seaside shrub in warm countries, the seeds of which are often cast ashore by the waves.

COMBRETACEÆ.

Laguncularia racemosa, Gært.

Laguncularia racemosa, Gært.; Griseb., Fl. Brit. W. Ind., p. 276 Chapman, Fl. Southern U.S., p. 136 (*Conocarpus racemosus*, Linn.)

On the shore. A maritime shrub from Florida to Bahia, and on the western coast of Africa.

MYRTACEÆ.

Eugenia axillaris, Poir., is doubtless the same that we have referred to *Eugenia monticola*, DC.

RUBIACEÆ.

Spermacoce tenuior, Lam. In the Walsingham tract.

BORAGINEÆ.

Lithospermum distichum, Orteg.

Lithospermum distichum, Orteg.; DC., Prodr., x. p. 77.

This Mexican plant is enumerated by Sir J. H. Lefroy as a native of the sea-shore.

VERBENACEÆ.

Callicarpa ferruginea, Swartz?

Callicarpa ferruginea, Swartz? Griseb., Fl. Brit. W. Ind., p. 499

Chiefly in the Walsingham tract. A common West Indian species.

URTICACEÆ.

Sponia lamarckiana, Dcne.

Sponia lamarckiana, Dcne.; Griseb., Fl. Brit. W. Ind., p. 150.

Forms the underwood of a large part of the Walsingham tract, especially near Paynter's Vale. A common West Indian species.

JUNCACEÆ.

Juncus maritimus, Lam.

Juncus maritimus, Lam.; Chapman, Fl. Southern U.S., p. 493.

Common in the wetter portions of the marshes. A widely dispersed rush.

GRAMINEÆ.

Arundinaria tecta, Muhl.

Arundinaria tecta, Muhl.; Chapman, Fl. Southern U.S., p. 561.

This common swamp reed of the south-eastern States is recorded as indigenous in the Bermudas, but no special locality is given.

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PLATE I.

PLATE I.

A plant of *Erigeron darrellianus*, natural size.

Figure 1.—A capitulum.

„ 2.—Bracts of the involucre.

„ 3.—A ray-flower.

„ 4.—Upper part of style from the same.

„ 5.—A bristle of the pappus.

„ 6.—A disk-flower.

„ 7.—A stamen from the same.

„ 8.—Upper part of style from the same : all enlarged.

This drawing represents a specimen in Kew Herbarium, collected by Sir J. H. Lefroy.

W.H.Fitch del. et lith.

Hanhart imp.

ERIGERON DARRELLIANUS, *Hemsl.*

PLATE II.

PLATE II.

A branch of *Borrichia arborescens*, the lowermost leaves of which are quite glabrous, while the others are clothed with a dense short down, natural size.

Figure 1.—An outer bract of the involucre.

„ 2.—A pale of the receptacle.

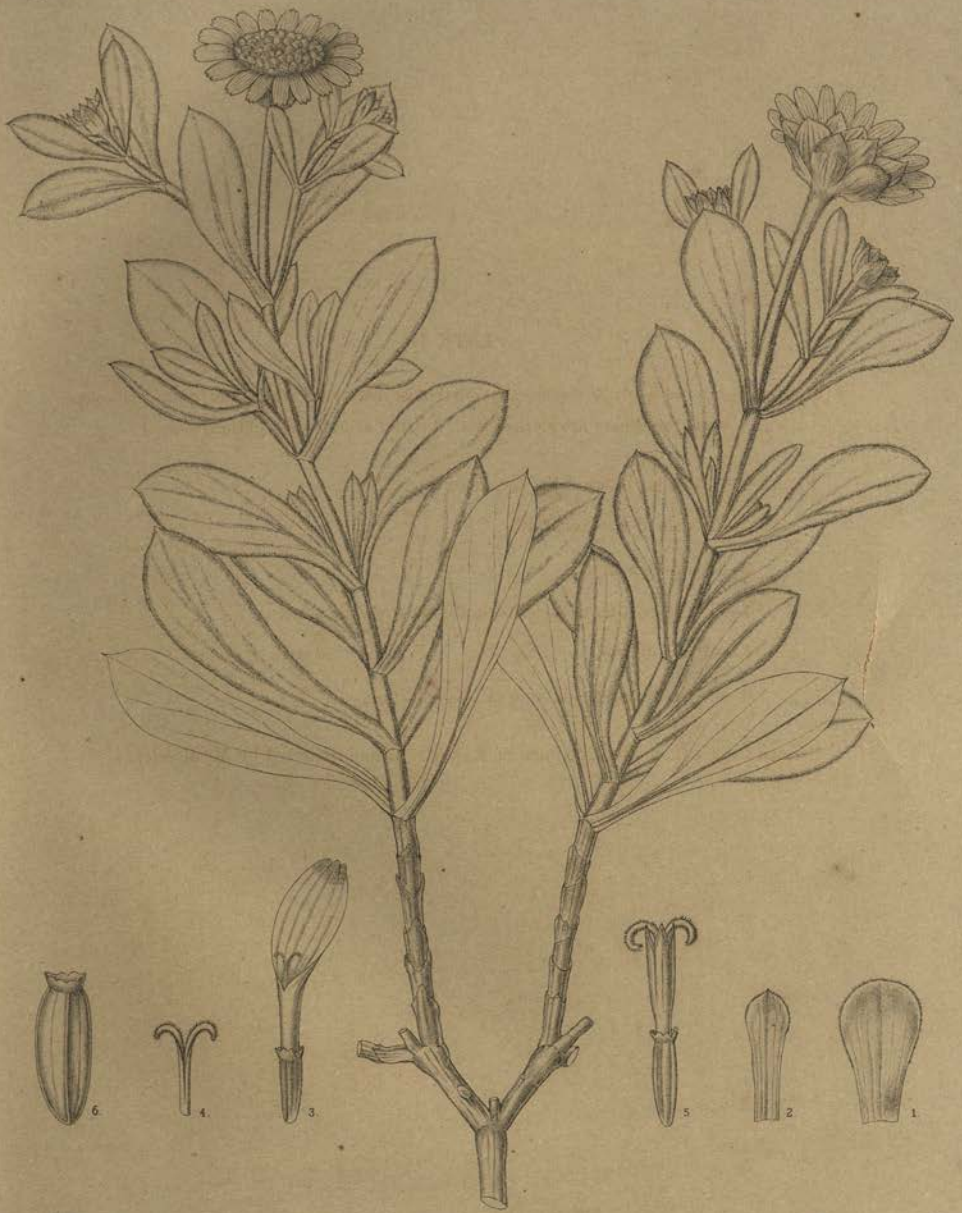
„ 3.—A ray-flower.

„ 4.—Upper portion of style, with stigma from the same.

„ 5.—A disk-flower.

„ 6.—A ripe achene: all more or less enlarged.

Drawn from a Bermudan specimen in Kew Herbarium, collected by Mr Moseley.



M. Smith del. Mc Farlane & Erskine. Lith^rs Edin^r

BORRICHIA ARBORESCENS, *D.C.*

PLATE III.

PLATE III.

Portion of a plant of *Borrichia frutescens*, natural size.

Figure 1.—A distinctly toothed leaf from a Texan specimen.

,, 2.—Portion of a hairy leaf.

,, 3.—Portion of a glabrous leaf.

,, 4.—An outer bract of the involucre.

,, 5.—One of the rigid pales of the receptacle.

,, 6.—A ray-flower.

,, 7.—Upper portion of style from the same.

,, 8.—A disk-flower.

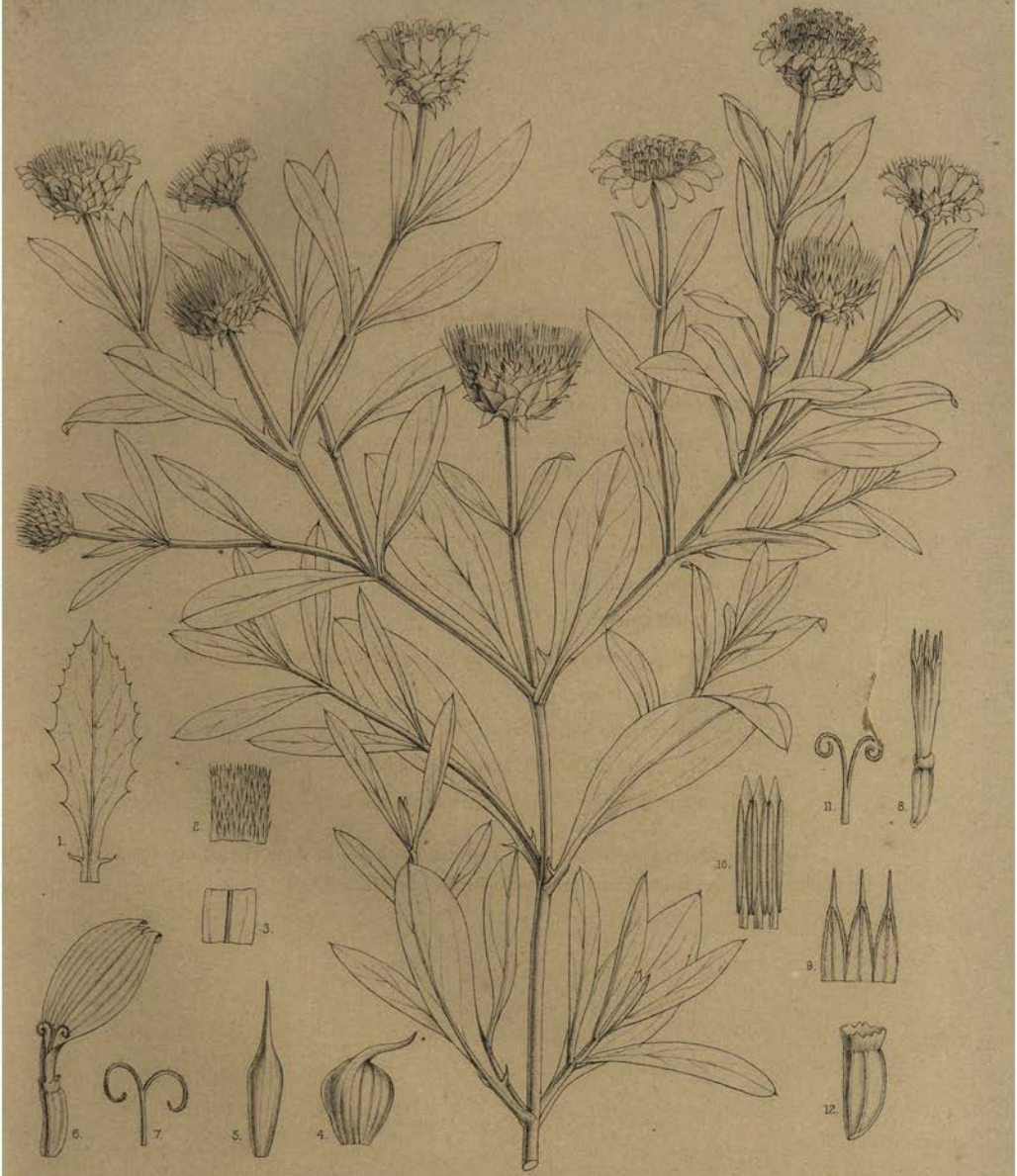
,, 9.—Portion of corolla of the same laid open, and showing the terete rigid tips of the lobes.

,, 10.—Anthers from a disk-flower.

,, 11.—Upper part of the style from a disk-flower.

,, 12.—A ripe achene : all enlarged except figure 1.

The main drawing was made from Floridan specimens in Kew Herbarium, the Bermudan being fragmentary and unsuitable for the purpose.



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BORRICHIA FRUTESCENS, *D.C.*

PLATE IV.

PLATE IV.

Portions of plant of *Statice lefroyi*, natural size.

Figure 1.—A spikelet.

,, 2.—A flower.

,, 3.—A petal and stamen.

,, 4.—A pistil : all enlarged.

Drawn from a specimen in Kew Herbarium, collected by Sir J. H. Lefroy.

M. Smith, del. M'Farlane & Erskine, Lith^rs Edin^r

STATICE LEFROYI, *Hemsl.*

PLATE V.

PLATE V.

Figure 1.—Portion of a young plant of *Juniperus bermudiana*, with acicular spreading leaves.

„ 2.—A branch in the adult state, bearing very young fruit.

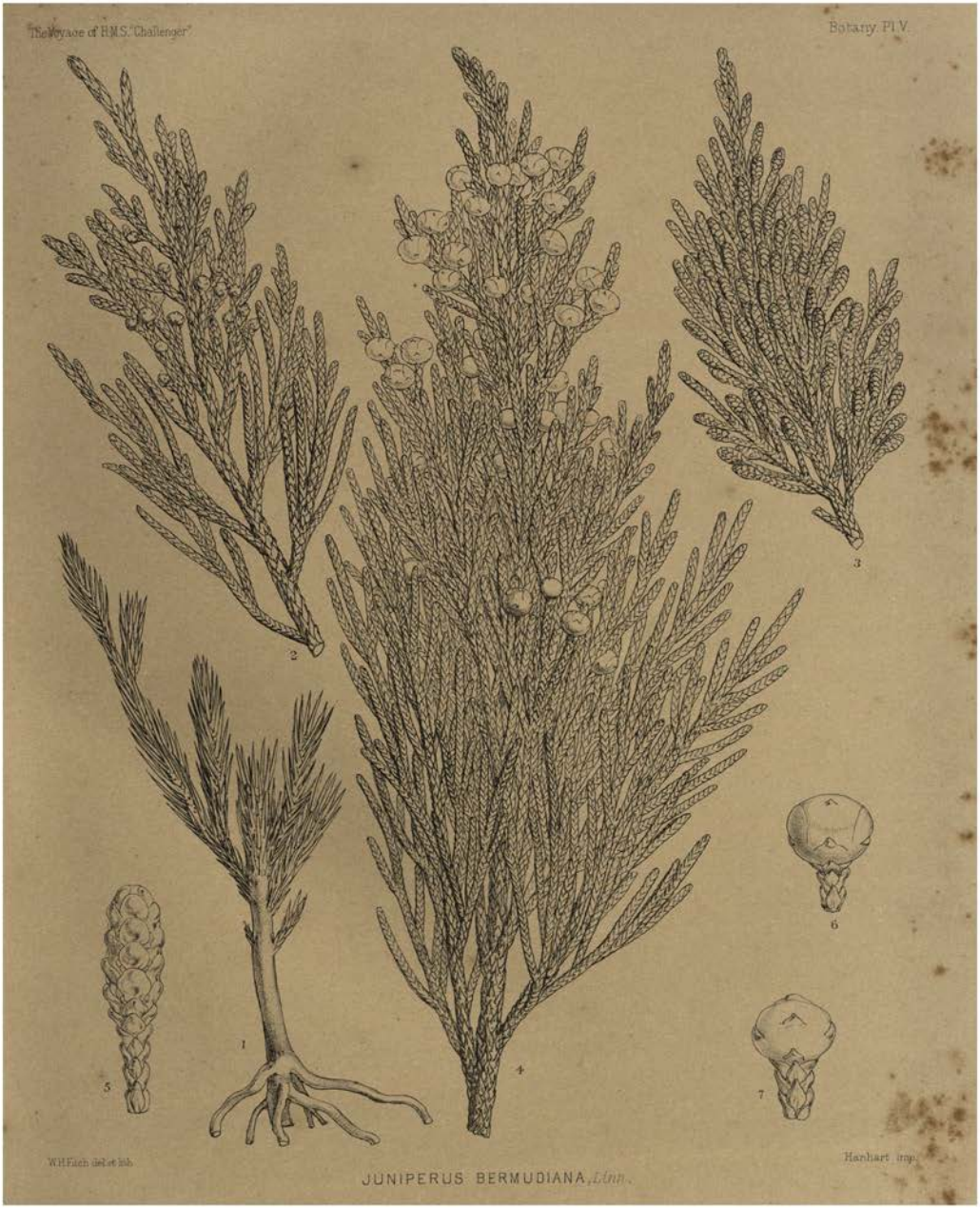
„ 3.—A branch bearing male flowers.

„ 4.—A branch bearing nearly ripe fruit: all natural size.

„ 5.—A male inflorescence.

„ 6, 7.—Fruits, enlarged.

The drawings were made from specimens in Kew Herbarium: figure 1 from a native seedling, collected by the Rev. C. J. Johns; figure 2 from a specimen collected by Mr Lane; figures 3 and 5 from a specimen collected by Sir W. Reid; and figures 4, 6, and 7 from a specimen collected by Mr Moseley.



W.H. Fitch del. et lith.

Hanhart imp.

JUNIPERUS BERMUDIANA, *Linn.*

PLATE VI.

PLATE VI.

Sabal blackburniana.

A reduced representation of a tree growing in the palm-house of the Royal Gardens, Kew, about one-fortieth of the natural size.

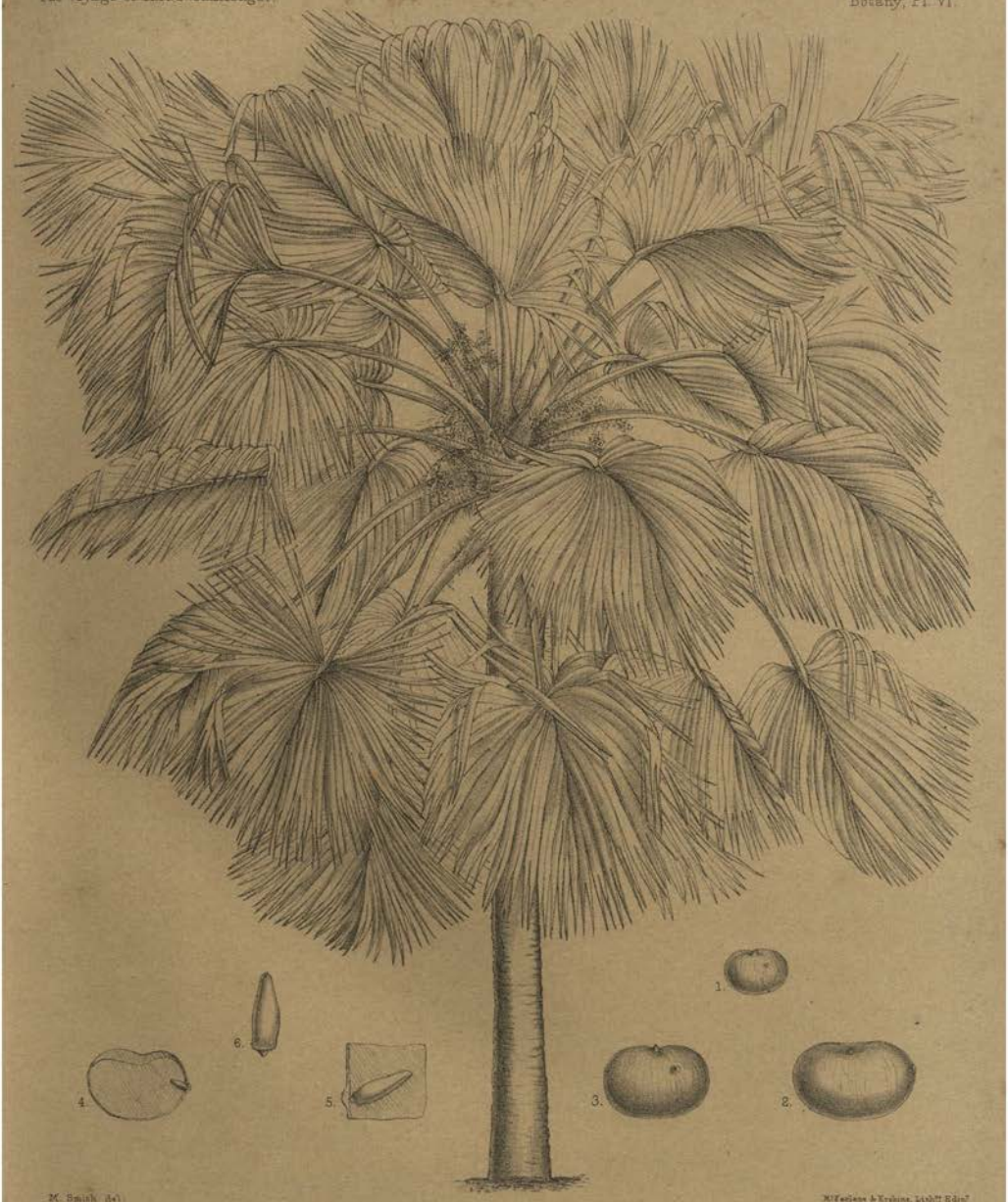
Figure 1.—A seed, natural size.

,, 2, 3.—The same, enlarged, from different positions.

,, 4.—A section of a seed, showing the embryo in position : slightly enlarged.

,, 5.—Embryo in position.

,, 6.—Embryo removed : both very much enlarged.



M. Smith del. M'Farlane & Erskine, Lith.rs Edin.r

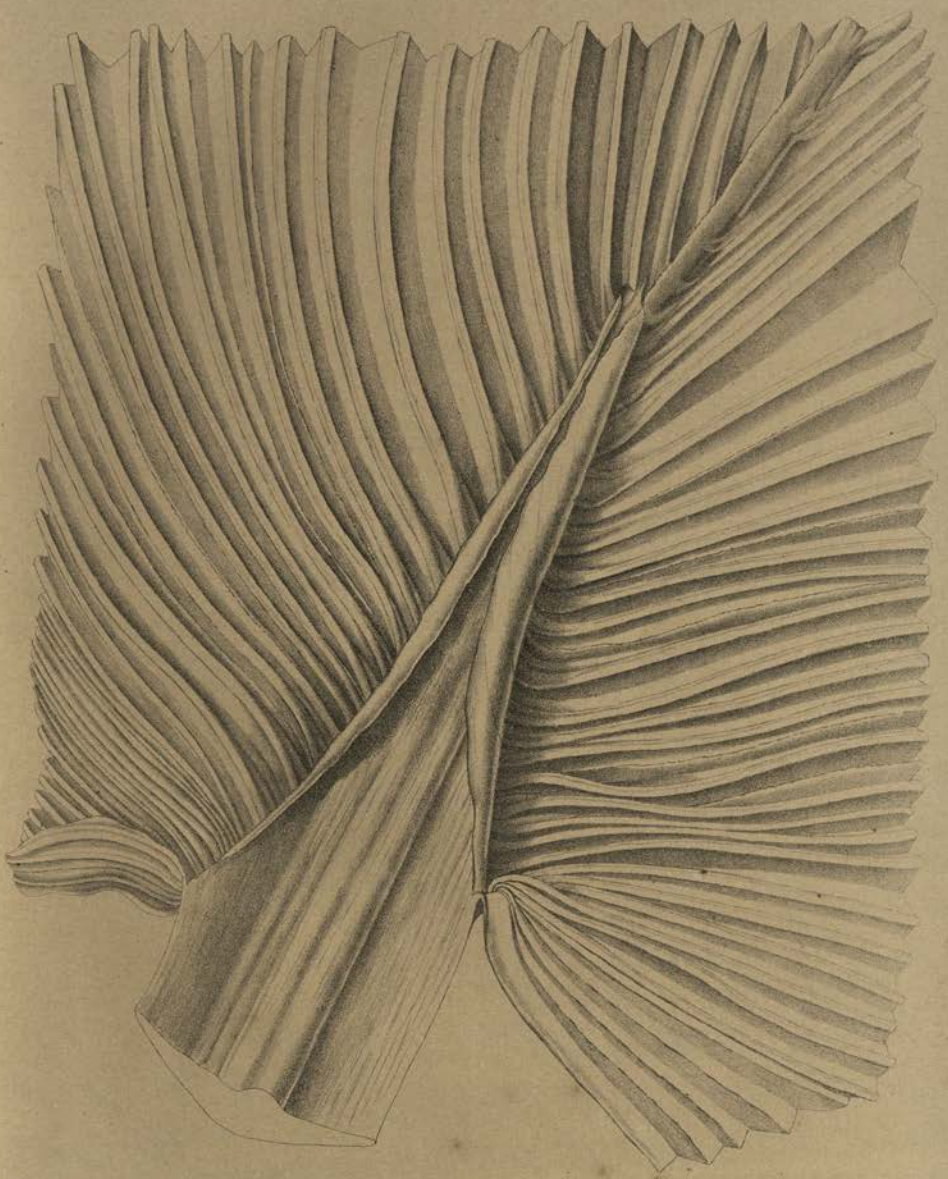
SABAL BLACKBURNIANA, *Glazebrook.*

PLATE VII.

PLATE VII.

Sabal blackburniana.

Basal part of the blade of a leaf, direct from the Bermudas: natural size.



SABAL BLACKBURNIANA, *Glazebrook.*

PLATE VIII.

PLATE VIII.

Sabal blackburniana.

Figure 1.—A young seedling raised in the Royal Gardens, Kew, from seed received from the Bermudas.

„ 2.—Terminal portion of a segment of the same leaf, of which the basal part of the blade is represented in Plate VII. : natural size.

SABAL BLACKBURNIANA, *Glazebrook*

PLATE IX.

PLATE IX.

Sabal blackburniana.

Figure 1.—Small portion of an inflorescence.

„ 2.—The same at a later stage.

„ 3.—Ripe fruit: all natural size.

„ 4.—An unexpanded flower.

„ 5.—An expanded flower.

„ 6.—The coherent petals laid open, showing the adherent stamens.

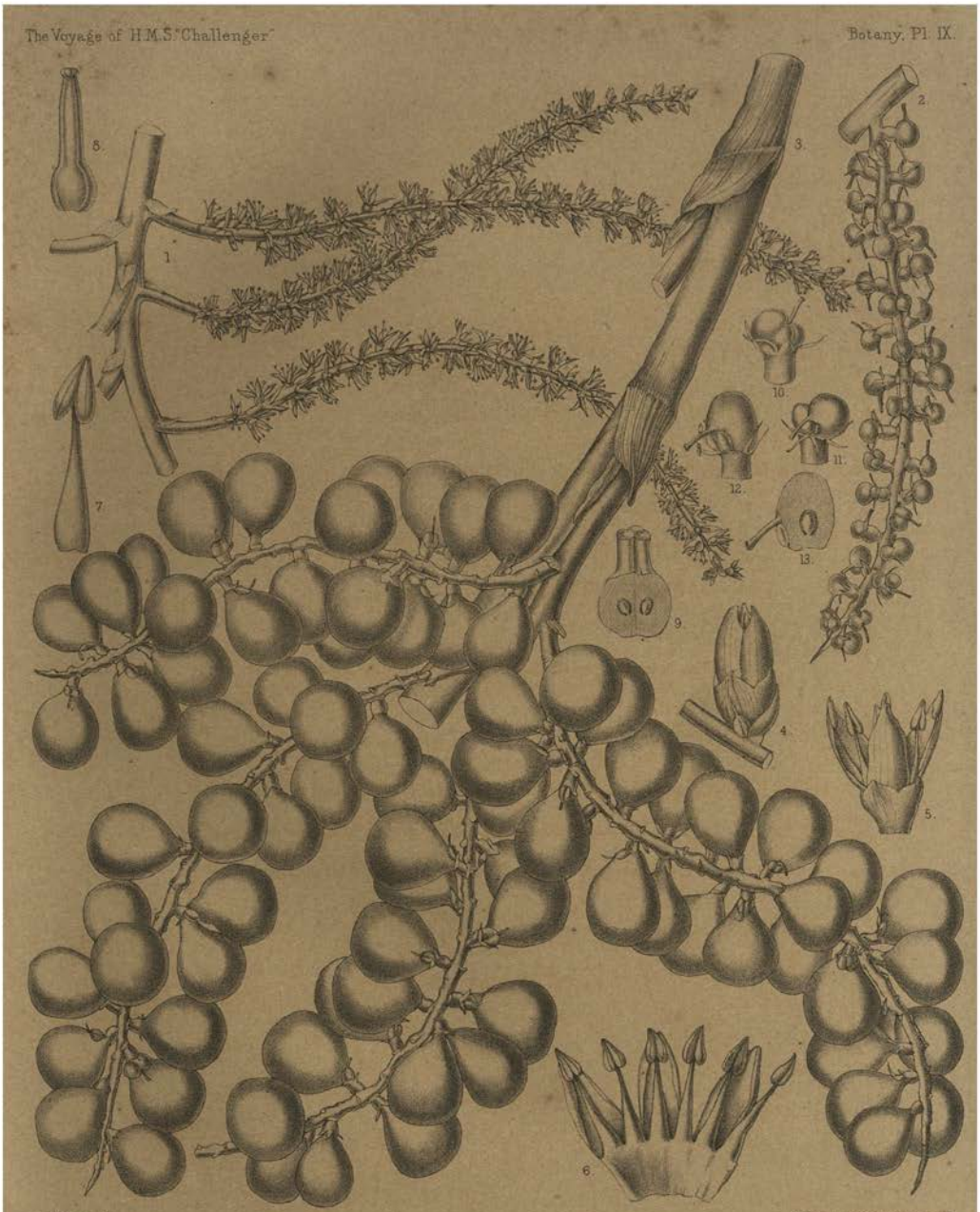
„ 7.—A stamen.

„ 8.—A pistil.

„ 9.—A tangential vertical section of the lower part of the same.

„ 10, 11, 12.—Variously developed pistils, shortly after the flowering stage.

„ 13.—Vertical section of a pistil of the same age: all enlarged.



M. Smith del. M.Farlane & Erskine, Lith.rs Edin.r

SABAL BLACKBURNIANA, *Glazebrook.*

PLATE X.

PLATE X.

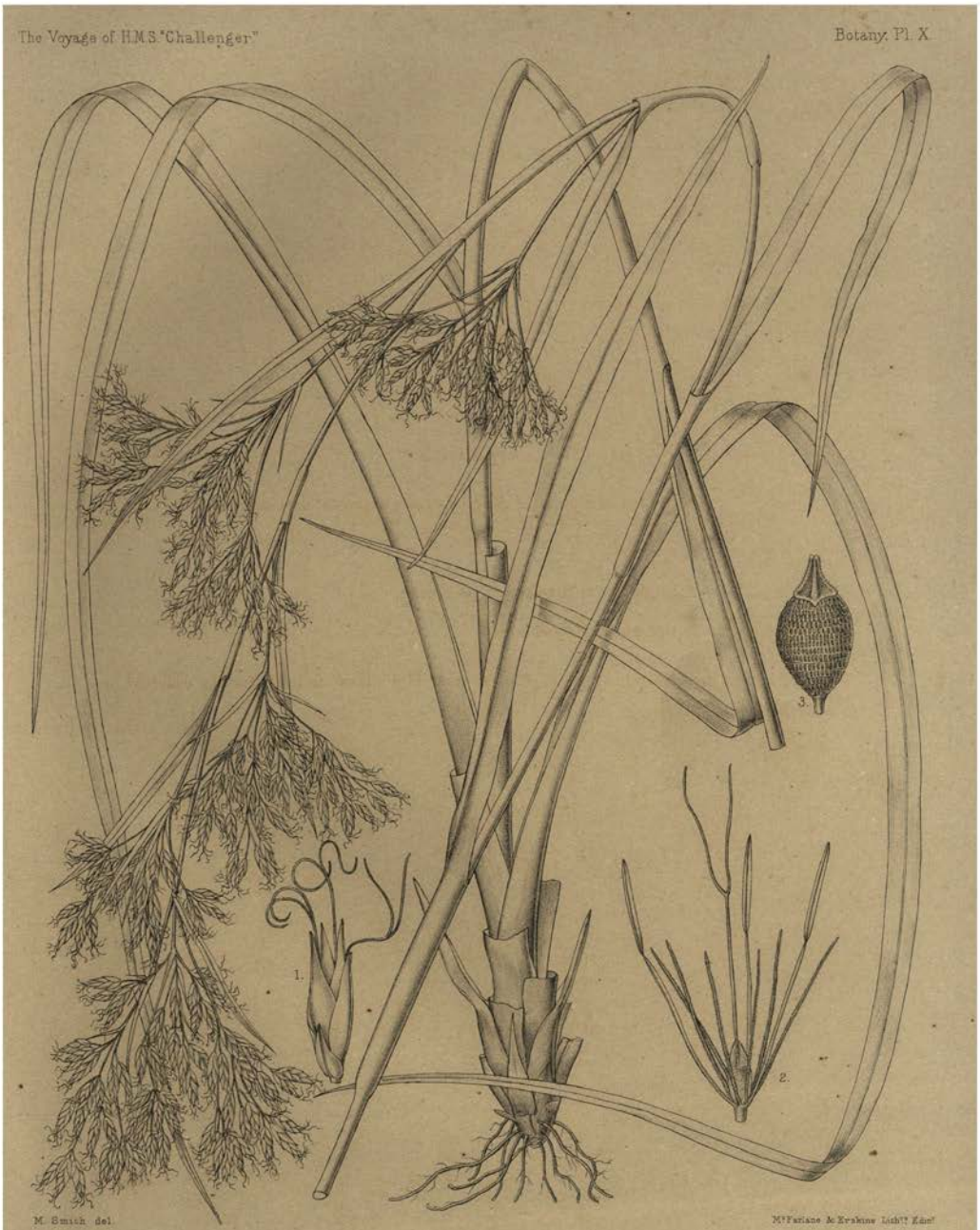
A portion of a plant of *Rhynchospora stipitata*, natural size.

Figure 1.—A spikelet.

„ 2.—A single flower divested of its glume.

„ 3.—A ripe nutlet : all enlarged.

The drawing was made from a plant in Kew Herbarium, from Bermuda, collected by Mr Moseley.



M. Smith del.

McFarlane & Erskine Lith^rs Edin^r

RHYNCHOSPORA STIPITATA, *Chapm.*

PLATE XI.

PLATE XI.

Fronds of *Asplenium bellum*, natural size, with one pinnule enlarged. Drawn from a living plant cultivated at Kew.

W.H.Fitch del. et lith. Hanhart imp.

ADIANTUM BELLUM, *T.Moore.*

PLATE XII.

PLATE XII.

A frond of *Asplenium* (*Diplazium*) *laffanianum*, natural size.

Figure 1.—Tertiary segment, enlarged.

„ 2.—Quaternary segment, more enlarged.

W.H. Fitch del. et lith. Banhart's imp.

ASPLENIUM (DIPLAZIUM) LAFFANIANUM, *Baker*.

PLATE XIII.

PLATE XIII.

A frond of *Nephrodium bermudianum*, cut in two, natural size.

Figure 1.—A tertiary segment.

,, 2.—Indusium.

,, 3.—Portion of a sorus.

,, 4, 5.—Sporangia in different positions: all enlarged.

Drawn from a specimen in Kew Herbarium, collected by Dr Farlow.

M. Smith del.

M.ª Farlane & Erskine, Lith.ª Edin.ª

NEPHRODIUM BERMUDIANUM. *Baker.*

THE

VOYAGE OF H.M.S. CHALLENGER.

BOTANY.

REPORT on the Botany of the Bermudas and various other Islands of the Atlantic and Southern Oceans. By W. Botting Hemsley, A.L.S.

SECOND PART.

ST PAUL'S ROCKS.

INTRODUCTORY NOTES.

These rocks lie in about 29° W. long. and 1° N. lat., and are about 540 miles distant from the coast of South America, and 350 miles from the island of Fernando-Noronha. They are scarcely more than half a mile in circumference, and their highest point is only sixty-four feet above sea-level. The group resembles a horse-shoe in shape, and consists of five peaks of rock disposed in four principal masses; and the rocks have been classed as serpentine.[1] They support absolutely no vegetation beyond a few algæ. Various travellers have landed, though even in ordinary weather there is some difficulty in doing so, in consequence of the great rapidity of the current on the one side and the heavy swell in the most sheltered parts. Mr Moseley appears to be the only person who has collected what the rocks offer in the form of vegetable life, and his account of the visit of the expedition in the Journal of the Linnean Society of London (xiv. p. 354), which is here reproduced, embodies all that is known of their botany:—

"Darwin, in his Naturalist's Voyage, describes the utterly barren condition of St Paul's Rocks as far as vegetation is concerned, not even a single lichen having been found by him. He speaks

[1] For a full account of the Petrology of these Rocks, see Narr. Chall. Exp., vol. ii., Appendix B.; and vol. i. chap. vi.

further of innumerable kinds of sea-weed as growing upon the rocks. Mr McCormick, in Ross's Antarctic Voyage, speaks of a conferva of which the sea-birds build their nests. Sir Joseph Hooker, in his Flora Antarctica, refers to Darwin's admirable account of the island.

"I spent about twenty-four hours on the rocks during our two days' stay, and searched carefully for botanical specimens. The sea-weeds, instead of being present in innumerable kinds, are, as far as I could ascertain, comparatively few in number, very few species apparently being able to hold their own in the constant heavy surf.

"About tide-mark, and indeed forming the mark, there is, as at St Vincent, a band of dense pinkish-white incrustation, consisting of a calcareous alga, which is bored in all directions by a small tubicolous annelid. This is evidently the reddish band referred to by Mr McCormick as the work of coral insects. In some places the incrustation is white, with a different surface, and probably consisting of a different species of alga.[1] Above the line of incrustation the rocks are covered for several feet with a dark red stain, consisting of an alga[2] of which specimens were preserved in fluid; and here, where the rock is alternately covered and left bare by the surf, grows a short filamentous alga, which has tufts of a green conferva adhering to it. The rocky bottom in the small, comparatively sheltered bay formed by the circlet of rocks is covered with a dense growth of a green alga, which extends out a short distance beyond the mouth of the bay to the depth of twenty fathoms (whence I got up specimens on a fishing-line), and also grows abundantly on the exposed side of the island, as I saw on looking down into the water from the summit of the highest peak. The alga (*Caulerpa clavifera*) is constantly loosened by the surf from the bottom, and, floating to the surface, is gathered by the noddies (*Sterna stolida*) to build their nests; the boobies (*Sula fusca*) apparently do not use it. A second smaller but similar species grows with this alga in the bay. I found only one or two other algæ, and when looking down into the water from above could see only the larger green species covering the bottom. The water deepens so very rapidly around the rock that it is improbable that many species of algæ grow on it; in fact, the marine flora seems to be remarkably poor.

"On the aerial surface of the rock I found a green *Chlorococcus* growing in sheltered crevices, on concretionary masses formed of guano mixed with the pupæ of the pupiparous fly *Olfersia*, discovered by Darwin on the island, and spiders' webs. The *Chlorococcus* is the only aerial plant on the island, and it is not abundant. In some pools of stagnant water are some few diatoms and *Oscillatoriæ*. In some places there are a few bushels of guano to be found in hollows in the rock. I boiled some of this with nitric acid; it was almost wholly soluble, and I could find no diatoms in the small residue. Peruvian guano contains abundance of diatoms. A *Coscinodiscus* has occurred sparingly of late upon the surface of the sea; and it might have been expected to find its way through the small surface-animals into the fish and thus into the guano. Diatoms have as yet, however, never been abundant either at the surface or on the sea bottom. In the curious veins of conglomerate which traverse the rock in all directions, and are described by Darwin and Mr McCormick, are fossil fragments of nulliporic incrustation mingled with pebbles and broken shells." —*H. N. Moseley.*

Altogether only seventeen species of vegetable organisms have been collected on and in the vicinity of the Rocks, and they are all algæ.

[1] *Lithothamnion polymorphum.* [2] *Hildenbrandtia expansa.*

ENUMERATION OF THE PLANTS.

ALGÆ.

MELANOSPERMEÆ.

SPOROCHNACEÆ.

Chnoospora atlantica, J. G. Agardh.

Chnoospora atlantica, J. G. Agardh, Alg. Liebm., p. 7; Dickie in Journ. Linn. Soc. Lond., xiv. p. 356.

Chnoospora fastigiata β atlantica, J. G. Agardh, Sp. Alg., i. p. 172; Harv., Nereis Bor.-Am., i. p. 79.

ST PAUL'S ROCKS. *Moseley.*

A very slender form, the peculiar dilatations below the axils of the segments only here and there apparent.

La Guayra, Venezuela; Fernando-Noronha.

DICTYOTACEÆ.

Dictyota cuneata, n. sp.?

Dictyota cuneata, n. sp.? Dickie in Journ. Linn. Soc. Lond., xiv. p. 356.

Radicans inferne, attenuata; segmentis paucis, sursum dilatatis, apicibus obtusis rotundatis. Fructus?

ST PAUL'S ROCKS. *Moseley.*

Hitherto not found elsewhere.

Nearest in habit to *Dictyota polycarpa*.

ECTOCARPACEÆ.

Ectocarpus breviarticulatus, J. G. Agardh.

Ectocarpus breviarticulatus, J. G. Agardh, Alg. Liebm., p. 7, et Sp. Alg., i. p. 16; Dickie in Journ. Linn. Soc. Lond., xiv. p. 356.

ST PAUL'S ROCKS. *Moseley.*

Very plentiful, growing upon the *Chnoospora*.

"On some of the specimens I found the propagula abundant, and evidently mature; in form and size I can see no essential difference between them and those of *Ectocarpus simpliciusculus*, K. A. Agardh."—*Dickie.*

San Augustin, on the Pacific coast of Mexico, is the only other locality recorded for this species.

RHODOSPERMEÆ.

CORALLINACEÆ.

Lithothamnion polymorphum, Linn.

Lithothamnion polymorphum, Linn.; J. G. Agardh, Sp. Alg., ii. p. 524; Dickie in Journ. Linn. Soc. Lond., xiv. p. 356.
Melobesia polymorpha, Harv., Nereis Austr., p. 110.

ST PAUL'S ROCKS. *Moseley.*

Abundant, forming a distinct band along the rocks; the *Chnoospora* at a rather higher level.[1]

Atlantic and Mediterranean shores; South Africa; Chonos Archipelago.

Melobesia lichenoides, Kütz.

Melobesia lichenoides, Kütz., Sp. Alg., p. 697; Dickie in Journ. Linn. Soc. Lond., xiv. p. 357.

ST PAUL'S ROCKS. *Moseley.*

Sparingly with the *Delesseria* and *Nitophyllum.*

Shores of Britain and France; various parts of Mediterranean; Norfolk Island; Southern Ocean.

SPHÆROCOCCOIDEÆ.

Delesseria spathulata, Sonder?

Delesseria spathulata, Sonder? Dickie in Journ. Linn. Soc. Lond., xiv. p. 357.

ST PAUL'S ROCKS. *Moseley.*

"Only two or three imperfect specimens mixed with the *Nitophyllum;* half an inch long by about a line in breadth. I could see no fruit, and can only judge from outline, venation, and general arrangement of the cells that it may be a form of Sonder's plant."—*Dickie.*

East coast of Australia.

[1] "Most of the specimens were drilled throughout by various organisms. A few fragments were sent to Dr M'Intosh of Murthly, and Mr Jeffreys. They report the presence of sponge, a mollusk allied to *Vermetus*, *Stoa*, and *Spiroglyphus*, and annelids belonging to the genera *Dodecaceria* and *Sabella*."—*Dickie.*

Nitophyllum acrospermum, J. G. Agardh.

Nitophyllum acrospermum, J. G. Agardh, Sp. Alg., ii. p. 655; Dickie in Journ. Linn. Soc. Lond., xiv. p. 357.

St Paul's Rocks. *Moseley.*

"The specimens few and not well preserved; but on some the tetraspores form a solitary circular patch near the apex of the frond, and in other respects agree with the general characters of the species."—*Dickie.*

Cape of Good Hope.

Squamarieæ.

Hildenbrandtia expansa, n. sp.

Hildenbrandtia expansa, n. sp., Dickie in Journ. Linn. Soc. Lond., xiv. p. 357.

Incrustans, vage expansa, ferrugineo-sanguinea; cellulæ superficiales radiatim dispositæ, sphærosporis irregulariter divisis.

The cells of the surface have a distinctly radiate arrangement, are equal in length and breadth, in diameter = 0·0002 to 0·0004 of an inch. The plant is stated by Mr Moseley to form a dull red band on rocks above the white band of *Lithothamnion*. Its nearest ally seems to be *Hildenbrandtia rosea*, Kütz., which occurs on the Atlantic shores of Europe.

St Paul's Rocks. *Moseley.*

Only known from these rocks.

Ceramiaceæ.

Callithamnion?

Callithamnion?

St Paul's Rocks. *Moseley.*

"In small quantity, forming a slender fringe about two lines long upon a few plants of the *Chnoospora*; no fruit, and altogether too imperfect for recognition; it seems, however, nearly allied to *Callithamnion pygmæum*, Kütz."—*Dickie.*

Chlorospermeæ.

Siphonaceæ.

Caulerpa webbiana, Mont.

Caulerpa webbiana, Mont., Phytogr. Canar., p. 178, t. 9, et Syll. Gen. et Sp. Crypt., p. 453; Dickie in Journ. Linn. Soc. Lond., xiv. p. 358.
Chauvinia webbiana, Kütz., Sp. Alg., p. 499.

St Paul's Rocks. *Moseley.*

Canary Islands; Fernando-Noronha.

Caulerpa clavifera, K. A. Agardh.

Caulerpa clavifera, K. A. Agardh, Sp. Alg., i. p. 437; Dickie in Journ. Linn. Soc. Lond., xiv. p. 358. *Chauvinia clavifera*, Kütz., Sp. Alg., p. 498.

St Paul's Rocks. *Moseley.*

"The leaves, commonly so called, are longer in proportion and more densely imbricated than usual; in these respects the specimens collected by Mr Moseley are nearly allied to *Caulerpa lætevirens*, Mont., from Toud Island, Southern Ocean, of which I have not seen any authentic specimens. It appears to be plentiful and of large size, and is used by *Sterna stolida* to form its nests."—*Dickie.*

Ulvaceæ.

Prasiola minuta, n. sp. ?

Prasiola minuta, n. sp.? Dickie in Journ. Linn. Soc. Lond., xiv. p. 358.

Thallo e basi angustata lineari-lanceolato; cellulis subquadratis, in basi 1–3, sursum 5–6 seriatis.

A very minute species, only detected by use of the microscope; no example quite entire could be seen; diameter of the broadest frond = 0·0014 of an inch.

St Paul's Rocks.—In stagnant rock-pools among fine mud—*Moseley.*

Oscillatoriaceæ.

Oscillaria sordida, n. sp. ?

Oscillaria sordida, n. sp.? Dickie in Journ. Linn. Soc. Lond., xiv. p. 358.

Trichomatibus sordide viridibus, ad apicem obtusis, articulis quam diameter (0·0004) quadruplo brevioribus, ad genicula paulo contractis.

St Paul's Rocks. *Moseley.*

Sparingly and very fragmentary along with the *Prasiola.*

Palmellaceæ.

Protococcus affinis, n. sp. ?

Protococcus affinis, n. sp.? Dickie in Journ. Linn. Soc. Lond., xiv. p. 358.

Protococcus sordide viridis, cellulis globosis (diam. = 0·0002 in.–0·0004 in.), in stratum tenue cumulatis.

St Paul's Rocks. *Moseley.*

"It seems to be nearly allied to *Protococcus viridis*, Ag. It forms a dull green coat upon stalactitic masses among guano in sheltered crevices."[1]—*Dickie.*

[1] "This is doubtless similar to the matter alluded to by Mr Darwin 'as resembling some of the branched species of nullipore.' It does not effervesce in acids; and Mr Darwin found it on the Abrolhos Islands among birds' dung."—*Dickie.*

Diatomaceæ.

Navicula didyma, Kütz.

Navicula didyma, Kütz., Bacill., p. 100, t. 4, fig. 7, et t. 28, fig. 75; Sp. Alg., p. 83; Dickie in Journ. Linn. Soc. Lond., xiv. p. 359.

St Paul's Rocks. *Moseley.*

North America.

Rhambdonema adriaticum, Kütz.

Rhambdonema adriaticum, Kütz., Bacill., p. 126, t. 18, fig. 7, et Sp. Alg., p. 116; Dickie in Journ. Linn. Soc. Lond., xiv. p. 359.

St Paul's Rocks. *Moseley.*

Adriatic; Mediterranean; Black Sea.

Biddulphia pulchella, Gray.

Biddulphia pulchella, Gray; Dickie in Journ. Linn. Soc. Lond., xiv. p. 359.
Biddulphia trilocularis, Kütz., Sp. Alg., p. 137.

St Paul's Rocks. *Moseley.*

West Indies and coast of Peru.

These are the only diatoms observed; they were procured by washing some specimens from the nests of the *Sterna;* guano from the same might have yielded other species.

FERNANDO-NORONHA AND CONTIGUOUS ISLETS.

INTRODUCTORY NOTES.

Previously to the visit of the Challenger Expedition little was known of the botany of Fernando-Noronha, and from circumstances explained below Mr Moseley was only able to bring away specimens of a small number of plants.

In the Appendix to Webster's narrative of Captain Foster's voyage in the "Chanticleer"[1] are some general observations on the vegetation of the island, but nothing exact. It was also one of the places at which H.M.S. "Beagle" touched, and Mr Darwin mentions[2] one or two of the more striking trees, &c. He also dried specimens of about a dozen of the plants met with, which he gave to the late Professor Henslow. They are now in the Herbarium of Cambridge University, and through the kindness of Professor Babington we have been able to examine them. Two of them, *Oxalis noronhæ* and *Pisonia darwinii*, were undescribed, and are apparently endemic. The former was also collected by Mr Moseley. Altogether, Mr Moseley collected about fifty species of flowering plants, and had not the Governor withdrawn his permission to collect on the main island, the collection would have been much larger. It is large enough, however, to give a correct idea of the composition of the flora. With the exception of the two plants named above and *Cereus insularis*, *Gonolobus micranthus*, and *Ficus noronhæ*, which we have not been able to match with any continental forms, almost every one is exceedingly common in Tropical America, if it has no wider range of distribution. The four new species collected by Mr Moseley are all from an outlying islet, St Michael's Mount, and not from the main island; and one of them, as already mentioned, was collected by Mr Darwin, most likely in Fernando-Noronha itself. Judging, then, from the sample we have seen, the flora is wholly Tropical American, with no greater infusion of peculiar species than would be found in a similar area on the mainland. The new species exhibit no striking characteristics; and it is not probable that further exploration would lead to the discovery of a specially insular endemic element; for Mr Moseley believes that he nearly exhausted the flora of St Michael's Mount. A surprising and noteworthy feature in the flora is the apparently total absence of ferns and mosses.

[1] Voyage of the "Chanticleer," London, 1834.

[2] Journal of Researches, 2d ed., p. 11.

With a few trifling alterations and corrections, Mr Moseley's notes[1] on the plants are reproduced below:—

"Fernando-Noronha is in 3° 50′ S., and is about 200 miles from Cape San Roque, the nearest point of South America. The main island is about four miles in length, and nowhere more than four and a half broad, and the length of the group formed by it and its outliers is seven geographical miles. It stretches nearly north-east and south-west, and at its eastern extremity is a series of very small islands, named Platform Island, St Michael's Mount, Booby Island, Egg Island, and Rat Island.

"At about the middle of the northern coast of the main island is a remarkable column-like mass of bare rock projecting up to the height of 1000 feet. It is known as the Peak, which is composed of phonolite; and the island generally is volcanic, many of the exposed cliffs evidently consisting of columnar basalt. There are dunes of calcareous sand at the eastern extremity of the island, and some sand-rock like that of Bermuda. The island is hilly, one hill being 600 feet in height. St Michael's Mount is a conical mass of phonolite 300 feet in height. The other islands are low and flat, and are mainly or entirely composed of sandstone rock like that of Bermuda, but containing volcanic particles.

"There is a rainy and a dry season. The rainy season is from January to July, and the dry from July to December. In the dry season there is occasionally want of water; but it often rains during this season, as it did heavily during our stay.

"Apparently the only account of the vegetation of Fernando-Noronha existing is that given by Webster in his narrative of Captain Foster's voyage. He mentions a series of plants as occurring, most of which I recognised. Darwin in his Journal mentions only two plants—a dark laurel-like tree, and one with pink flowers, but without leaves. All the higher ground of the island, where not cleared for cultivation, with the exception of the perpendicular part of the Peak, is covered with a thick growth of trees, which are indicated on the Admiralty chart. The trees are none of them large; all the large ones have been cut down, it is said, by the convicts for the construction of the small rafts or catamarans which are used by them for fishing. The trees are overgrown with dense masses of creepers of various kinds. The plant-growth is thickest, and apparently virgin, at the western extremity of the island, near the opening through the rock called the Hole-in-the-Wall. The commonest tree is that called by Webster the laurelled Bara. It has dark-green laurel-like leaves and an abundant milky juice, and the bark is smooth and brown. I could find no flower or fruit on the tree, but did not search much, since I expected to be able to collect specimens next day. I unfortunately did not even secure a leaf. The tree, which is evidently the laurel-like tree referred to by Darwin, does not grow on any of the outlying islands. Another abundant tree, or rather large shrub, is the one called by Webster jatropha or pinhao, *Jatropha gossypifolia*. It has a pink flower, and had only single tufts of young leaves immediately beneath the inflorescences at the time of our visit, although it was in full flower. Its bare stems and branches render it a striking object amongst the green of the creepers when the forest is viewed from the sea. Webster says that it casts its leaves in July and August, that is, at the commencement of the dry season. It is evidently the tree mentioned by Darwin as occurring on the Peak; and it also grows on St Michael's Mount and Rat Island. On the main island I saw several specimens of an apparently Euphorbiaceous tree, with rounded leaves of a bluish-green and stout thorns. I looked for flowers

[1] *Journal of the Linnean Society of London*, xiv. p. 359.

and fruit without success. One of the trees was about twenty feet high and nine inches in diameter of trunk. Some thorny acacia bushes are abundant on the shore, and *Abrus precatorius* twines round everything on the main island; but I did not see it on the outliers. *Jatropha urens* is abundant everywhere, and a horrible pest.

"*Ipomœa pes-caprœ*, the same as at Bermuda and the Cape Verdes, is in abundance on the sand-hills, and is covered with *Cuscuta americana*, which is extremely abundant, and attacks most of the low herbs.

"I saw only one grass (*Oplismenus colonus*) on the main island, but that was abundant. *Cereus insularis* covers the cliffs; but I did not see anything answering to the *Cactus quadrangularis* mentioned by Webster. The Cape gooseberry and castor-oil plant grow wild on all the islands. Some few of the plants which I collected on the main island were from the neighbourhood of the convict settlement, and are probably introduced species.

"The upper part of St Michael's Mount is covered with a thick growth of bushes, trees, and creepers. The island is comparatively inaccessible, and affords no space for cultivation; hence all the plants upon it have probably reached it through natural agencies. I was several hours on this island, and believe that I made a tolerably complete collection of its flora. At the base of the rock grows an *Ipomœa* with a large white flower. I did not see this species on the main island, but only the blue-flowered one, *Ipomœa pes-caprœ*, which does not grow on St Michael's Mount or any of the other outliers on which we landed, although this white-flowered species is abundant on all of them. A fig, *Ficus noronhœ*, grows all over the upper part of St Michael's, and in favourable spots forms a considerable tree. I saw one about eighteen inches in diameter of trunk and thirty feet in height. The tree is wide and spreading, and throws down aerial roots like *Ficus indica*. Webster mentions the banyan as growing at Fernando-Noronha: this is evidently the tree referred to. It grows also on Rat Island near the sea-level, but does not there form a tree, being merely a low bush. Another tree, *Capparis cynophallophora*, with dark-green leaves of an oval lanceolate form, grows abundantly on the summit of St Michael's Mount. It has a stem about eight or nine inches in diameter, and an almost creeping habit. On Rat Island there is a thick growth of grass with clinging seeds mingled with Leguminous and Euphorbiaceous herbs and Cucurbitaceous creepers; but there is no tree, there not being sufficient shelter from the wind. The fig does not reach more than five or six feet in height.

"On the whole, I should expect, from what I saw during my few hours on the islands, that the flora of Fernando-Noronha is not very rich in species, the same plants recurring everywhere. I collected only about fifty species of flowering plants in all.

"I found neither fern nor moss, either on the mainland or on St Michael's Mount, although there are moist and shady spots about the latter rock where ferns might grow. Lichens were very scarce. I noticed only two incrusting species, and these were not abundant.

"There is a small inland lake marked on the chart at the western extremity of the main island. Ferns, sedges, &c., may possibly grow there; but perhaps the occasional drought is too much for them.

"The top of the Peak, which is quite inaccessible, appears to be without vegetation. Marine algæ, excepting incrusting calcareous forms, are not at all abundant about tide-mark; but about twenty-four species were obtained by Professor Thomson whilst dredging in shallow water, from seven to twenty fathoms. A green *Ulva* grows on some low rocks on the sandy northern beach.

"Sugar-cane, maize, cassava, a black bean, and sweet potatoes are cultivated in Fernando-

Noronha, the beans and maize in the greatest quantities. Bananas and melons are the principal fruits; the latter are especially fine and abundant. Grapes are not now cultivated, though they are said to do well."

Mr Moseley mentions a few common plants which are not included in our enumeration, simply because we have not seen specimens.

In Kew Herbarium there is a specimen of *Capparis cynophallophora* collected by a Captain Middleton, and there may be a few others scattered through the Herbarium in the South American covers.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

CAPPARIDEÆ.

Capparis cynophallophora, Linn.

Capparis cynophallophora, Linn., Sp. Pl., ed. 1, p. 504; DC., Prodr., i. p. 249; Jacq., Sel. Stirp. Amer., t. 98; Griseb., Fl. Brit. W. Ind., p. 18 (varietates).

FERNANDO-NORONHA. *Middleton; Darwin; Moseley.*

Very widely dispersed in Tropical America, especially in maritime districts.

PORTULACEÆ.

Portulaca oleracea, Linn.

Portulaca oleracea, Linn., Sp. Pl., ed. 1, p. 445; DC., Prodr., iii. p. 353; Griseb., Fl. Brit. W. Ind., p. 57.

FERNANDO-NORONHA. *Moseley.*

In nearly all tropical and subtropical countries, especially in maritime districts.

Talinum patens, Willd.

Talinum patens, Willd., Sp. Pl., ii. p. 863; Jacq., Hort. Vindob., ii. t. 151.
Portulaca paniculata, Griseb., Fl. Brit. W. Ind., p. 57.

FERNANDO-NORONHA. *Moseley.*

In maritime districts chiefly, from Mexico and the West Indies to Buenos Ayres.

MALVACEÆ.

Sida spinosa, Linn.

Sida spinosa, Linn., Sp. Pl., ed. 1, p. 683; Griseb., Fl. Brit. W. Ind., p. 74.

FERNANDO-NORONHA. *Moseley.*

Very common in the warmer parts of America, and generally dispersed in the tropics of the Old World.

Malachra radiata, Linn.

Malachra radiata, Linn., Syst. Veg., p. 518; DC., Prodr., i. p. 440; Griseb., Fl. Brit. W. Ind., p. 81.

Fernando-Noronha. *Moseley.*

Widely dispersed in Tropical America.

STERCULIACEÆ.

Waltheria americana, Linn.

Waltheria americana, Linn., Sp. Pl., ed. 1, p. 637 (including W. Indies, Linn.); Griseb., Fl. Brit. W. Ind., p. 95.

Fernando-Noronha. *Darwin; Moseley.*

Generally spread in warm countries.

GERANIACEÆ.

Oxalis noronhæ, Oliver, n. sp.

Frutex erectus, 1–2 pedalis, vel tortuosus, nodosus et humilior, pilis simplicibus vel ramosis vestita. *Folia* alterna, longe petiolata, 3-foliolata; foliola ovato-elliptica, 1–2 poll. longa, acuminata, obtusiuscula, subtus pubescentia, supra glabrescentia, lateralia obliqua, brevissime petiolata; petiolus gracilis, semiteres, supra canaliculatus, undique pilosulus 1–2½ poll. longus. *Flores* pauci, conferti, subumbellati, breviter pedicellati, vix 6 lineas longi, pedunculis quam folia sæpius longioribus; calyx pilosus vel setulosus, sepalis oblongo-lanceolatis obtusiusculis; petala lutea, obtusa, sepalis subduplo longiora; stamina basi brevissime coalita; ovarium glabrum, profunde 5-lobum, lobis dorso tricostatis, apice deinde et breviter obtuse productis; ovula solitaria.—Hook., Ic. Pl., xiiii. p. 21, t. 1226. Descriptio parum mutata.

Fernando-Noronha, Rat Island, and St Michael's Mount.—Without special locality—*C. Darwin; Moseley.*

"Allied to *Oxalis insipida*, St. Hil., and in facies near Gardner's *Oxalis* (No. 2080), collected in Piauhy."—D. Oliver, *loc. cit.*

AMPELIDEÆ.

Vitis sicyoides, Baker.

Vitis sicyoides, Baker in Mart. Fl. Bras., xiv. pars 2, p. 202.
Cissus sicyoides, Linn., Sp. Pl., ed. 2, p. 170; Griseb., Fl. Brit. W. Ind., p. 102.

Fernando-Noronha. *Moseley.*

General in Tropical and Subtropical America.

SAPINDACEÆ.

Cardiospermum halicacabum, Linn.

Cardiospermum halicacabum, Linn., Sp. Pl., ed. 1, p. 366 ; Griseb., Fl. Brit. W. Ind., p. 122.

FERNANDO-NORONHA. *Moseley.*

Common in tropical and subtropical countries all over the globe.

ANACARDIACEÆ.

Anacardium occidentale, Linn.

Anacardium occidentale, Linn., Sp. Pl., ed. 1, p. 383 ; Griseb., Fl. Brit. W. Ind., p. 176 ; Desc., Fl. Ant., vii. t. 507.

FERNANDO-NORONHA. *Moseley.*

Mexico and West Indies to Brazil, and naturalised in nearly all other tropical countries.

LEGUMINOSÆ.

PAPILIONACEÆ.

Tephrosia cinerea, Pers.

Tephrosia cinerea, Pers., Ench., ii. p. 328 ; Jacq., Ic. Pl. Par., t. 575 ; Griseb., Fl. Brit. W. Ind. p. 182.

FERNANDO-NORONHA. *Moseley.*

Mexico and the West Indies to Uruguay.

Phaseolus peduncularis, H. B. K.

Phaseolus peduncularis, H. B. K., Nov. Gen. et. Sp., vi. p. 447 ; Benth. in Mart. Fl. Bras., xv. pars 1, p. 184.

FERNANDO-NORONHA. *Moseley.*

Panama eastward, and southward to North Brazil.

Desmodium spirale, DC.

Desmodium spirale, DC., Prodr., ii. p. 332 ; Benth. in Mart. Fl. Bras., xv. pars 1, p. 105 ; Griseb., Fl. Brit. W. Ind., p. 188.

FERNANDO-NORONHA. *Moseley.*

Common in tropical regions in both hemispheres.

CÆSALPINIEÆ.

Cassia tora, Linn.

Cassia tora, Linn., Sp. Pl., ed. 1, p. 376 ; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 535 ; Griseb., Fl. Brit. W. Ind., p. 209, sub *Cassia obtusifolia*.

FERNANDO-NORONHA. *Moseley.*

Generally dispersed in the tropics.

Cassia occidentalis, Linn.

Cassia occidentalis, Linn., Sp. Pl., ed. 1, p. 377; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 532; Griseb., Fl. Brit. W. Ind., p. 209.

FERNANDO-NORONHA. *Moseley.*

All over Tropical America, and also now common in Tropical Asia and Africa, though probably of American origin.

ONAGRARIEÆ.

Jussiæa linifolia, Vahl.

Jussiæa linifolia, Vahl, Eclog. Bot., ii. p. 31; Micheli in Mart. Fl. Bras., xiii. pars 2, p. 162.
Jussiæa acuminata, Swartz; Griseb., Fl. Brit. W. Ind., p. 272.

FERNANDO-NORONHA. *Moseley.*

Nearly everywhere in the tropics.

Cereus insularis, Hemsl., n. sp. (Plate XIV.)

Cereus insularis, Hemsl., n. sp.

Cereus repens vel vagans, valde ramosus, ramis cylindricis 1–2 poll. diametro, 6-angulatis; costæ tenues, compressæ, continuæ; areolæ confertæ, breviter tomentosæ; aculei 12–15, inæquales, radiati, teretes, flavi. *Flores* flavi, circiter 5 poll. longi; calycis tubus præter squamellas parvas paucissimas nudus, glaber, $3\frac{1}{2}$–4 poll. longus, ut videtur rectus, sepalis pauciseriatis augustis acutis, longioribus pollicaribus; petala pauciserrata augusta, acuta, sepala vix excedentia; stamina numerosissima, multiseriata, quam petala breviora, filamentis filiformibus; ovarium inerme, paucisquamosum; stylus stamina superans, stigmate 13-radiato.

ST MICHAEL'S MOUNT. *Moseley.*

This species is near *Cereus flagelliformis*, Haworth, *Cereus flagriformis*, Zuccarini, and others of the group *Flagriformes* in habit; but its yellow flowers more nearly approach those of *Cereus cœrulescens*, Pfeiffer, in having an almost naked calyx tube. Moseley states that it covers the cliffs with a tangled mass of branches.

CUCURBITACEÆ.

Trianosperma racemosa, Griseb.

Trianosperma racemosa, Griseb., Cat. Pl. Cub., p. 112; Cogniaux in DC. Monogr. Phanerog., iii. p. 768 (varietates 7), sub *Cayaponia*.
Cionandra racemosa, Griseb., Fl. Brit. W. Ind., p. 286.

ST MICHAEL'S MOUNT. *Moseley.*

Mexico to Venezuela, and Cuba to Trinidad and Guiana.

Cucumis anguria, Linn.

Cucumis anguria, Linn., Sp. Pl., ed. i. p. 1011; Cogniaux in DC. Monogr. Phanerog., iii. p. 501; Griseb., Fl. Brit. W. Ind., p. 288.

St Michael's Mount. *Moseley.*

Florida and Texas, through Mexico and the West Indies to Peru and Brazil.

Momordica charantia, Linn.

Momordica charantia, Linn., Sp. Pl., ed. i. p. 1009; Cogniaux in DC. Monogr. Phanerog., iii. p. 436; Griseb., Fl. Brit. W. Ind., p. 287.

Rat Island and St Michael's Mount. *Moseley.*

Everywhere in tropical and subtropical regions, but supposed to have been introduced into America.

RUBIACEÆ.

Spermacoce parviflora, Hemsl.

Spermacoce parviflora, Hemsl. in Salv. et Godm. Biolog. Centr. Am., Bot., ii. p. 59.
Borreria parviflora, G. F. W. Mey., Fl. Esseq., p. 83, t. i.; Griseb., Fl. Brit. W. Ind., p. 349.
Spermacoce hirta, Swartz *non alior.*

Fernando-Noronha. *Moseley.*

Common in Tropical America, from Guatemala to Peru and Brazil, and throughout the West Indies.

COMPOSITÆ.

Blainvillea rhomboidea, Cass.

Blainvillea rhomboidea, Cass. in Dict. Sc. Nat., xxix. p. 494; DC., Prodr., v. p. 492; Oliv., Fl. Trop. Afr., iii. p. 375.

Fernando-Noronha. *Moseley.*

Common in Brazil; also in Tropical Africa.

Eclipta alba, Hassk.

Eclipta alba, Hassk., Pl. Jav. Rar., p. 528; Griseb., Fl. Brit. W. Ind., p. 370.
Eclipta erecta, *Eclipta prostrata*, et *Eclipta punctata*, Linn., Mant. alt., p. 286.

Fernando-Noronha. *Moseley.*

A common weed in nearly all tropical and subtropical countries, and extending into temperate regions.

APOCYNACEÆ.

Rauwolfia ternifolia, Kunth.

Rauwolfia ternifolia, Kunth, Synop. Pl. Æquin., ii. p. 298; Griseb., Fl. Brit. W. Ind., p. 408; Bot. Mag., t. 2440.

FERNANDO-NORONHA. *Moseley.*

Trinidad, Venezuela, Guiana, and Brazil.

ASCLEPIADEÆ.

Gonolobus micranthus, Hook. (Plate XV.)

Gonolobus micranthus, Hook. f. MSS. in Herb. Kew.

Gracilis, floribus pro genere minutis, folliculis grosse muricato-tuberculatis.

Frutex volubilis vel scandens, ramulis gracilibus puberulis, cortice flavo. *Folia* longe graciliterque petiolata, membranacea, cordiformia, sinu clauso, lobis sæpius obtegentibus, absque petiolo 1–2 poll. longa, acuta, utrinque sparse beviterque pubescentia, supra in sinu 2–3 glandulosa; petiolus 1–2 poll. longus. *Flores* minuti, pauci in axillas conferti; calyx intus 5-glandulosus, lobis ovatis acutis intus glabris; corolla rotato-campanulata, intus setuloso-pubescens, lobis ovatis acutiusculis apicem versus tantum hirsutis; corona annulata, puberula, intus lineis crassis instructa, 5-lobata, lobis corollæ segmentis alternantibus gynostegio brevioribus; stigma planum. *Folliculi* longe grosseque muricato-tuberculati, simul furfuraceo-hirsuti; semina longe comosa, ovata, compressa, margine muricata.

ST MICHAEL'S MOUNT. *Moseley.*

BORAGINEÆ.

Heliotropium indicum, Linn.

Heliotropium indicum, Linn., Sp. Pl., ed. 1, p. 130; Griseb., Fl. Brit. W. Ind., p. 485; Bot. Mag. t. 1837.

Heliophytum indicum, DC., Prodr., ix. p. 556.

FERNANDO-NORONHA. *Darwin; Moseley.*

A common weed in warm countries.

CONVOLVULACEÆ.

Ipomœa pentaphylla, Jacq.

Ipomœa pentaphylla, Jacq., Collect., ii. p. 297, et Ic. Pl. Rar., t. 319; Griseb., Fl. Brit. W. Ind., p. 467.

Batatas pentaphylla, Choisy in DC. Prodr., ix. p. 339.

FERNANDO-NORONHA. *Moseley.*

Generally dispersed in tropical countries.

Ipomœa pes-capræ, Sweet.

Ipomœa pes-capræ, Sweet, Hort. Suburb. Londin. (1818), p. 35; Roth, Nov. Pl. Sp., p. 100; Griseb., Fl. Brit. W. Ind., p. 470.

FERNANDO-NORONHA. *Moseley.*

Very widely dispersed in warm countries, but chiefly on sandy sea-shores.

Ipomœa tuba, Don.

Ipomœa tuba, Don, Gen. Syst., iv. p. 271; Griseb., Fl. Brit. W. Ind., p. 467; Mart., Fl. Bras., vii. p. 216.

FERNANDO-NORONHA. *Moseley.*

West Indies, Guiana, and Brazil.

Cuscuta americana, Linn.

Cuscuta americana, Linn., Sp. Pl., ed 1, p. 124; Griseb., Fl. Brit. W. Ind., p. 476; Mart., Fl. Bras., vii. p. 376, t. 126, fig. 1.

FERNANDO-NORONHA. *Moseley.*

Mexico and the West Indies to Brazil.

SOLANACEÆ.

Solanum paniculatum, Linn.

Solanum paniculatum, Linn., Sp. Pl., ed. 2, p. 267; DC., Prodr., xiii. 1, p. 278.

FERNANDO-NORONHA. *Moseley.*

Common in Brazil.

Physalis hirsuta, Dun. var.?

Physalis hirsuta, Dun. var.? DC., Prodr., xiii. 1, p. 445.

FERNANDO-NORONHA. *Moseley.*

This may be the same as *Physalis pubescens*, Linn., a widely dispersed species in warm countries.

Datura stramonium, Linn.

Datura stramonium, Linn., Sp. Pl., ed. 1, p. 179; Griseb., Fl. Brit. W. Ind., p. 434.

FERNANDO-NORONHA. *Moseley.*

Everywhere, almost, in tropical and temperate regions where there is cultivation.

SCROPHULARINEÆ.

Scoparia dulcis, Linn.

Scoparia dulcis, Linn., Sp. Pl., ed. 1, p. 116; Griseb., Fl. Brit. W. Ind., p. 427; DC., Prodr., x. p. 431.

FERNANDO-NORONHA. *Moseley.*

Common in nearly all tropical and subtropical countries.

BIGNONIACEÆ.

Bignonia, sp. ?

Bignonia, sp. ?

FERNANDO-NORONHA. *Darwin.*

Only a small branch and two or three flowers: insufficient for determination.

VERBENACEÆ.

Lantana lilacina, Desf.

Lantana lilacina, Desf., Cat. Hort. Par., ed. 3, p. 392; DC., Prodr., xi. p. 604; Griseb., Fl. Brit. W. Ind., p. 604, sub *Lantana stricta*.

FERNANDO-NORONHA. *Moseley.*

West Indies to Brazil.

LABIATÆ.

Hyptis suaveolens, Poit.

Hyptis suaveolens, Poit. in Ann. Mus. Par., vii. p. 472, t. 29, fig. 2; DC., Prodr., xii. p. 126; Griseb., Fl. Brit. W. Ind., p. 489.

FERNANDO-NORONHA. *Moseley.*

Common in Tropical America, and naturalised in India.

Hyptis pectinata, Poit.

Hyptis pectinata, Poit. in Ann. Mus. Par., vii. p. 474, t. 30; DC., Prodr., xii. p. 127; Griseb., Fl. Brit. W. Ind., p. 489.

FERNANDO-NORONHA. *Moseley.*

From Mexico and Cuba to Uruguay.

NYCTAGINEÆ.

Bœrhaavia paniculata, Rich.

Bœrhaavia paniculata, Rich.; Choisy in DC. Prodr., xiii. 2, p. 450; Griseb., Fl. Brit. W. Ind., p. 69.

Bœrhaavia diffusa, Swartz *non* Linn.

FERNANDO-NORONHA. *Moseley.*

Florida, Georgia, Mexico, Central America, and West Indies.

Pisonia darwinii, Hemsl. (Plate XLVII.)

Pisonia darwinii, Hemsl., n. sp.

Hermaphrodita ? inermis, foliis parvis ovato-rotundatis cymis terminalibus paucifloris breviter pedunculatis.

Frutex novellis ferrugineo-puberulis aut pulverulentis; ramuli crassiusculi, tortuosi, nodosi, glabrescentes, internodiis brevibus. *Folia* opposita, petiolata, crassiuscula, mollia

(juniora tantum visa) rotundata vel ovata, absque petiolo usque ad 15 lineas longa, margine undulata, præcipue subtus ferrugineo-pubescentia; petiolus 3-4 lineas longus. *Flores* parvi (perianthium circiter sesquilineam longum) in cymas parvas terminales dispositi, subsessiles, intus extusque ferrugineo-pulverulenti; perianthium auguste campanulatum, plicatum vix lobatum; stamina 7 vel 8 exserta; ovarium glabrum, 1-ovulatum, stylo incluso. *Fructus* deest.

FERNANDO-NORONHA. *Darwin.*

This is quite distinct from anything we have seen from either the mainland or the West Indies, and, in fact, is not very closely allied to any species. We were unable to decide whether it is truly hermaphrodite.

AMARANTACEÆ.

Euxolus viridis, Moq.

Euxolus viridis, Moq. in DC. Prodr., xiii. 2, p. 273; Griseb. Fl. Brit. W. Ind., p. 68.

FERNANDO-NORONHA. *Moseley.*

Very widely spread in warm countries.

Philoxerus vermicularis, R. Br.

Philoxerus vermicularis, R. Br., Prodr. Fl. N. Holl., p. 416; Griseb., Fl. Brit. W. Ind., p. 65.
Iresine vermicularis et *Iresine aggregata*, Moq. in DC. Prodr., xiii. 2, p. 340.

FERNANDO-NORONHA. *Darwin; Moseley.*

Common in maritime districts of Tropical and Subtropical America; also in Western Africa.

PHYTOLACCACEÆ.

Rivina humilis, Linn.

Rivina humilis, Linn., Sp. Pl., ed. 1, p. 121; Griseb., Fl. Brit. W. Ind., p. 59, sub *Rivina glabra*; Bot. Mag., tt. 1781 et 2333.

FERNANDO-NORONHA. *Darwin; Moseley.*

Exceedingly common in Tropical and Subtropical America, and naturalised in many parts of the Old World.

EUPHORBIACEÆ.

Euphorbia comosa, Vell.

Euphorbia comosa, Vell., Fl. Fluminensis, t. 15; DC., Prodr., xv. 2, p. 66.

FERNANDO-NORONHA. *Moseley.*

Brazil, though only recorded from the neighbourhood of Rio de Janeiro and San Cristoforo.

Euphorbia hypericifolia, Linn.

Euphorbia hypericifolia, Linn., Hort. Cliff., p. 198; DC., Prodr., xv. 2, p. 23; Hook., Exot. Fl., t. 36; Griseb., Fl. Brit. W. Ind., p. 54.

Fernando-Noronha. *Moseley.*

Very common and widely spread in the warmer parts of America.

Euphorbia pilulifera, Linn.

Euphorbia pilulifera, Linn., Amœn. Acad., iii. p. 114; DC., Prodr., xv. 2, p. 21; Jacq., Ic. Pl. Rar., iii. t. 478; Griseb., Fl. Brit. W. Ind., p. 54.

Fernando-Noronha. *Moseley.*

Generally spread in tropical countries.

Euphorbia thymifolia, Burm.

Euphorbia thymifolia, Burm., Fl. Ind., p. 2; DC., Prodr., xv. 2, p. 47; Griseb., p. 53, sub *Euphorbia maculata*.

Fernando-Noronha. *Moseley.*

Generally spread in tropical countries, and extending into some subtropical regions.

Phyllanthus brasiliensis, Müll.

Phyllanthus brasiliensis, Müll., Arg. in DC. Prodr., xv. 2, p. 383 (varietas *genuina*).
Phyllanthus conami, Swartz; Griseb., Fl. Brit. W. Ind., p. 33.

Fernando-Noronha. *Moseley.*

West Indies, Venezuela, Eastern Peru, Guiana, and Brazil; also recorded by Grisebach from Yucatan.

Jatropha gossypifolia, Linn.

Jatropha gossypifolia, Linn., Sp. Pl., ed. 1, p. 1006; DC., Prodr., xv. 2, p. 1086 (varietates); Griseb., Fl. Brit. W. Ind., p. 36.

Fernando-Noronha. *Moseley.*

Widely diffused in Tropical America, and occurring in West Africa.

Jatropha urens, Linn.

Jatropha urens, Linn., Sp. Pl., ed. 1, p. 1007; DC., Prodr., xv. 2, p. 1100 (varietates); Jacq., Hort. Vindob., i. p. 8, t. 21.

Fernando-Noronha. *Moseley.*

Southern States of North America, through Mexico, to Brazil.

In addition to the foregoing Euphorbiaceæ, Sir Joseph Hooker's manuscript list of the plants collected by Mr Darwin in Fernando-Noronha contains two species of *Acalypha* and one species of *Sapium*, which we have not seen, as, for some reason, they were not sent with the others from Cambridge.

URTICACEÆ.

Ficus noronhæ, Oliver.

Ficus noronhæ, Oliver, n. sp.

Arbor glabra, ramis crassis angulatis. *Folia* petiolata, tenuiter coriacea, obovato-elliptica vel elliptica, 3–6 poll. longa, apice obtusa [obtusissima vel rotundata], basi obtusa vel anguste cordata, integerrima, glaberrima, nervo medio subtus prominente, venis primariis lateralibus utrinque 6–7; petiolus [incrassatus] 3–12 lineas longus; stipulæ caducæ, oblongo-lanceolatæ, longe acuminatæ, acutæ, 1–1½ poll. longæ. *Receptacula* depresso-globosa, 6–9 lineas diametro, glabra, lævia, sessilia, solitaria, bracteis 2–3 basalibus coriaceis late rotundatis instructa [juniora geminata bracteis plurimis omnino involventia]. *Flores* stipitati vel sessiles; perianthii segmenta concava, obtusa; stigma, ut videtur, bifidum, papillosum."—Hook., Ic. Pl., xiii. p. 18, t. 1222. Descriptio parum mutata.

St Michael's Mount. All over the upper part of the rock—*Moseley*.

MONOCOTYLEDONES.

CYPERACEÆ.

Cyperus ligularis, Linn.

Cyperus ligularis, Linn., Amœn. Acad., v. p. 31; Kunth, Enum., ii. p. 79; Griseb., Fl. Brit. W. Ind., p. 566.

Fernando-Noronha. *Moseley*.

Tropical America and Africa.

Cyperus densiflorus, Meyer.

Cyperus densiflorus, Meyer, Fl. Esseq., p. 34; Mart., Fl. Bras., ii. 1, p. 41; Kunth, Enum., Pl. ii. p. 104.

Fernando-Noronha. *Moseley*.

Brazil.

We have not seen the specimen of this species which is mentioned in the original catalogue under the name of *Cyperus schraderianus*, Mart., which Martius cites as a synonym of the above.

GRAMINEÆ.

Panicum colonum, Linn.

Panicum colonum, Linn., Sp. Pl., ed. 2, p. 84; Griseb., Fl. Brit. W. Ind., p. 545.
Oplismenus colonus, H. B. K., Nov. Gen. et Sp., i. p. 109; Kunth, Enum., i. p. 142.

Fernando-Noronha. *Moseley*.

Common in all tropical countries.

Panicum parvifolium, Lam.

Panicum parvifolium, Lam., Encycl., iv. p. 742; Mart., Fl. Bras., i. p. 261; Kunth, Enum., Pl. i. 1, p. 109.

FERNANDO-NORONHA. *Moseley.*

Guiana; Brazil.

Setaria verticillata, Beauv.

Setaria verticillata, Beauv., Agrost., p. 51; Kunth, Enum., Pl. i. 1, p. 152.

FERNANDO-NORONHA. *Moseley.*

In all tropical and most temperate regions where there is cultivation.

Cenchrus echinatus, Linn.

Cenchrus echinatus, Linn., Sp. Pl., ed. 1, p. 1050; Kunth, Enum. i. p. 166; Griseb., Fl. Brit. W. Ind., p. 556.

FERNANDO-NORONHA. *Moseley.*

Very widely spread, but often occurring only as a weed of cultivation.

Dactyloctenium ægyptiacum, Willd.

Dactyloctenium ægyptiacum, Willd., Enum. Pl. Hort. Berol., p. 1029; Kunth, Enum., i. p. 261; Griseb., Fl. Brit. W. Ind, p. 540.

FERNANDO-NORONHA. *Moseley.*

Common in nearly all warm countries.

CRYPTOGAMÆ.

VASCULARES.

Not a single species of this class of plants was collected; and if any species exist in the main island or neighbouring islets, they must be exceedingly rare, for Mr Moseley had them in mind, and specially sought after them.

CELLULARES.

With the exception of the one lichen described below, only aquatic cryptogams were found by Mr Moseley.

LICHENES.

LICHENACCI.

LECANOREI.

Lecanora recubans, Stirton.

Lecanora recubans, Stirton, n. sp.

Thallus (K. fl., C. fl.) albidus vel pallide cinereus, crassiusculus, rimoso-areolatus, *albo* determinatus; apothecia minuta, innata, concoloria, concava, marginata; sporæ 8-næ, simplices, incolores, ellipsoideæ, longit. 0·009–0·012 millim., crassit. 0·006–0·007 millim., non rite evolutæ; paraphyses non bene distinctæ, apicibus citrinis glanduloso-inspersis; hypothecium incolor. Gelatina hymenialis iodo dilute cærulescens, dein pallide fulvescens. —Journ. Linn. Soc. Lond., xiv. p. 375.

FERNANDO-NORONHA.—On rocks—*Moseley*.

This species is allied to *Lecanora bella*, Achar., *fide* Crombie in Journ. Linn. Soc. Lond., xvi. p. 219.

ALGÆ.

Excluding three or four, mostly cosmopolites, and the smaller species from the rock-pools, the algæ of Fernando-Noronha are chiefly related to those of the Mexican Gulf.

MELANOSPERMEÆ.

FUCACEÆ.

Sargassum vulgare, K. A. Agardh.

Sargassum vulgare, K. A. Agardh, Sp. Alg., i. p. 3; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley*.

Tropical and Subtropical Atlantic; Manilla; Mauritius.

The specimens much smaller than usual.

DICTYOTACEÆ.

Haliseris plagiogramma, Mont.

Haliseris plagiogramma, Mont., Cuba, p. 63, t. 3, fig. 3; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley*.

Cuba; Brazil; Sandwich Islands.

Haliseris delicatula, K. A. Agardh.

Haliseris delicatula, K. A. Agardh, Sp. Alg., i. p. 144; Harv., Nereis Bor.-Am., i. p. 103; Kütz., Sp. Alg., p. 562; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley*.

Florida; West Indies; Brazil.

Padina pavonia, Gaill.

Padina pavonia, Gaill., Résum., p. 24; Harv., Nereis Bor.-Am., i. p. 104; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley.*

Widely diffused in both hemispheres.

Dictyota ciliata, J. G. Agardh.

Dictyota ciliata, J. G. Agardh; Kütz., Sp. Alg., p. 556; Harv., Nereis Bor.-Am., i. p. 110; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley.*

Florida; West Indies; Australia; Ceylon.

Dictyota bartayresiana, Lamour.

Dictyota bartayresiana, Lamour.; Kütz., Sp. Alg., p. 554; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley.*

Florida; West Indies; eastern Atlantic Islands; Mauritius.

Asperococcus intricatus, J. G. Agardh.

Asperococcus intricatus, J. G. Agardh, Alg. Liebm., p. 7, et Sp. Alg., i. p. 77; Harv., Nereis Bor.-Am., i. p. 119.

FERNANDO-NORONHA. *Moseley.*

Gulf of Mexico.

RHODOSPERMEÆ.

RHODOMELACEÆ.

Amansia duperreyi, J. G. Agardh.

Amansia duperreyi, J. G. Agardh, Symb., p. 26, et Sp. Alg., ii. p. 1115; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

Rytiphlœa duperreyi, K. A. Agardh, Sp. Alg., ii. p. 52; Kütz., Sp. Alg., p. 844.

FERNANDO-NORONHA. *Moseley.*

Martinique.

Acanthophora thierii, Lamour.

Acanthophora thierii, Lamour.; Kütz., Sp. Alg., p. 858; Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley.*

Biarritz; Florida; West Indies; Brazil; Polynesia; Mauritius, &c.

CORALLINACEÆ.

Corallina ceratoides, Kütz.

Corallina ceratoides, Kütz., ex Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. On *Acanthophora thierii.*

Shores of Mexico.

Jania cubensis, Mont.

Jania cubensis, Mont. in Kütz., Sp. Alg., p. 709, et Syll. Gen. et Sp. Crypt., p. 429; Harv., Nereis Bor.-Am., ii. p. 84.

FERNANDO-NORONHA. *Moseley.*

Cuba; Gulf of Mexico; Florida; Cape Verde Islands.

Lithothamnion mamillare, Harv.

Lithothamnion mamillare, Harv., ex Dickie in Journ. Linn. Soc. Lond., xiv. p. 363.

FERNANDO-NORONHA. *Moseley.*

Bahia; Cape Verde; Algoa Bay.

SPHÆROCOCCOIDEÆ.

Gracilaria multipartita, Harv.

Gracilaria multipartita, Harv., Phyc. Brit., t. 15, et Nereis Bor.-Am., ii. p. 107; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

FERNANDO-NORONHA. *Moseley.*

Widely diffused.

Mr Moseley's specimens comprehend the ordinary form of the species, as also var. *β angustissima*, and forms intermediate between the two.

Gracilaria armata, J. G. Agardh.

Gracilaria armata, J. G. Agardh, Sp. Alg., ii. p. 591 ? ex Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

FERNANDO-NORONHA. *Moseley.*

Mediterranean; Florida.

Only two or three very imperfect specimens, and therefore the species doubtful, but having the structure of the genus.

SQUAMARIEÆ.

Peyssonnelia dubyi, Crouan.

Peyssonnelia dubyi, Crouan; Kütz., Sp. Alg., p. 694; Harv., Nereis Bor.-Am., ii. p. 130; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

FERNANDO-NORONHA. *Moseley.*

France; Britain; Florida.

A few very dwarfed specimens were found upon *Lithothamnion mamillare.*

Helminthocladeæ.

Galaxaura cylindrica, Lamour.

Galaxaura cylindrica, Lamour., Exp. Méth., p. 22, ex Kütz., Sp. Alg., p. 530; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Moseley.*

Barbadoes; Red Sea; Cape Verde Islands.

Galaxaura oblongata, Lamour.

Galaxaura oblongata, Lamour., Polyp. Flex., p. 262, ex Kütz., Sp. Alg., p. 529; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Moseley.*

West Indies; Ceylon; Cape of Good Hope.

Galaxaura marginata, Lamour.

Galaxaura marginata, Lamour.; Kütz., Sp. Alg., p. 530; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Moseley.*

West Indies; Madagascar; Mauritius.

Galaxaura rugosa, Lamour.

Galaxaura rugosa, Lamour.; Kütz., Sp. Alg., p. 530; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Moseley.*

West Indies; Mauritius; Gambier Islands; Cape Verde Islands; Fiji Islands.

Cryptonemiaceæ.

Chrysymenia enteromorpha, Harv. ?

Chrysymenia enteromorpha, Harv., Nereis Bor.-Am., ii. p. 187 ? ex Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Moseley.*

Florida.

The single very fragmentary specimen has the structure of the genus, but the species is doubtful.

CHLOROSPERMEÆ.

Siphonaceæ.

Caulerpa clavifera, K. A. Agardh.

Caulerpa clavifera, K. A. Agardh, Sp. Alg., i. p. 437; Harv., Nereis Bor.-Am., iii. p. 19; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Moseley.*

Canaries; Red Sea; Indian Ocean; Florida Keys.

Caulerpa mexicana, Sonder.

Caulerpa mexicana, Sonder; Kütz., Sp. Alg., p. 496; Harv., Nereis Bor.-Am., iii. p. 16, t. 37, A.

Fernando-Noronha. *Moseley.*

Gulf of Mexico; Florida Keys; Bermudas; Cape Verde Islands.

Caulerpa webbiana, Mont.

Caulerpa webbiana, Mont., Syll. Gen. et Sp. Crypt., p. 453; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Darwin.*

Canary Islands.

Halimeda opuntia, Lamour.

Halimeda opuntia, Lamour.; Kütz., Sp. Alg., p. 504; Harv., Nereis Bor.-Am., iii. p. 23, t. 40, B; Dickie in Journ. Linn. Soc. Lond., xiv. p. 364.

Fernando-Noronha. *Moseley.*

Florida, West Indies, and widely dispersed in warm seas.

Ulvaceæ.

Enteromorpha ——?

Enteromorpha ——? ex Dickie in Journ. Linn. Soc. Lond., xiv. p. 365.

Fernando-Noronha. *Moseley.*

So very imperfect that the genus only can be indicated; it seems nearly allied to *Enteromorpha clathrata*, Grev.

Kallonema obscurum, n. sp.

Kallonema obscurum, n. sp., Dickie in Journ. Linn. Soc. Lond., xiv. p. 365.

Frons capillaris, undulata, pallide virescens, vage et irregulariter ramosa, e cellulis subquadratis laxe connexis formata.

Fernando-Noronha. *Moseley.*

The specimens are very fragmentary, mixed with some of the following in rock-pools.

Ulva lobata, Kütz.

Ulva lobata, Kütz., Sp. Alg.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 365.

Fernando-Noronha. *Moseley.*

Chili; Cape of Good Hope; Mauritius; Ceylon; Macao; Singapore.

Confervaceæ.

Cladophora subvaricosa, n. sp.

Cladophora subvaricosa, n. sp., Dickie in Journ. Linn. Soc. Lond., xiv. p. 365.

Filamentis passim varicosis, sparsissime ramosis, articulis diametro 3–8-plo longioribus.

Fernando-Noronha. *Moseley.*

In rock-pools, with *Kallonema obscurum.*

Cladophora minuta, n. sp.

Cladophora minuta, n. sp., Dickie in Journ. Linn. Soc. Lond., xiv. p. 365.

Ramulis brevibus, alterne distributis, articulis omnibus diametro 10-plo longioribus.

Platform Island.—In rock-pools, with the next—*Moseley.*

A very small species 1 to 2 lines long; diameter = 0·001 inch.

Oscillatoriaceæ.

Lyngbya noronhæ, n. sp.

Lyngbya noronhæ, n. sp., Dickie in Journ. Linn. Soc. Lond., xiv. p. 365.

Vaginis valde mucosis, subhirtis, confluentibus, trichomatibus curvulis luteolis, articulis diametro 2–3-plo brevioribus.

Platform Island.—In rock-pools—*Moseley.*

Forming yellowish shrub-like masses, half an inch to an inch high; entire diameter of filaments = 0·0006 inch.

It seems nearly allied to *Lyngbya fulva*, Harv.

Palmellaceæ.

Hormospora pellucida, n. sp.

Hormospora pellucida, n. sp., Dickie in Journ. Linn. Soc. Lond., xiv. p. 365.

Tubulis simplicibus, mucosis, pellucidis, æqualibus; cellulis ellipticis, diametro 2-plo longioribus, in seriem moniliformem transverse dispositis.

Fernando-Noronha. *Moseley.*

A very delicate species; entire diameter of the filaments = 0·006 inch.

In rock-pools, mixed with *Cladophora*, &c., above described.

ASCENSION.

INTRODUCTORY NOTES.

Ascension is in the middle of the Atlantic Ocean, in lat. 7° 57′ S., and long. 14° 28′ W., and has an area of about thirty-four square miles, being about seven and a half miles long and six miles broad. It is wholly volcanic, and broken into hills and ravines, with a central peak, the Green Mountain, rising to a height of 2870 feet, and surrounded by a plateau from 1200 to 2000 feet high. There are no ponds or superficial springs, and therefore no running water, except during the rains; consequently, the island is exceedingly barren, except where artificial means have been employed to render the soil more productive.

The earliest record we have seen of the vegetation of Ascension is an enumeration[1] of the plants observed there by Mr James Cunninghame in 1698. The flowering plants mentioned therein, with their modern names, are :—

Chamæsyce frutescens elatior, floribus comosis	= Euphorbia origanoides.
Chamæsyce frutescens humilior, floribus comosis	= Euphorbia origanoides.
Convolvulus maritimus majore folio chinensi, Pluk., t. 24	= Ipomœa pes-capræ.
Ketmia fœtida flore luteo fundo purpureo	= Hibiscus trionum?
Festuca junceis foliis, spica minus sparsa, aristis trifidis	= Aristida adscensionis.

Mr James Britten, of the British Museum, has searched the Sloane Herbarium for these plants, but only succeeded in finding the *Aristida* (Herb. Sl., vol. cclvi. p. 61); and it is probable they do not exist, for the title of the record in the Philosophical Transactions indicates "Shells, &c., collected," and "Plants observed." Assuming that there was no mistake, Cunninghame observed one plant, *Ipomœa pes-capræ*, in the island, which, so far as we are aware, has never been collected or seen there since. It is possible that this widely-spread littoral plant may have obtained a transient footing from seeds cast ashore by the waves, and afterwards suffered destruction by some means. From the perfectly reliable evidence of the eminent traveller Burchell, we know that such a thing happens on the coast of St Helena.

It was not till about the middle of the eighteenth century that more definite information of the vegetation of Ascension was published. In or about the year 1752, Osbeck,

[1] A Catalogue of Shells, &c., collected at the Island of Ascension, by Mr James Cunninghame, Surgeon, with what Plants he observed there; communicated to Mr James Petiver, F.R.S. *Philosophical Transactions of the Royal Society of London* (1699), xxi. p. 295, and abridged edition, iv. p. 419.

a chaplain in the Swedish navy, brought home specimens of four flowering plants, which Linnæus described the following year in the first edition of his Species Plantarum (i. p. 82, &c.); and under *Aristida adscensionis* he has the following observation:—"*Habitat in Insula adscensionis, una ex quatuor istius pauperrimæ Floræ plantis, quarum* (1.) *Sherardia fruticosa*; (2.) *Euphorbia origanoides*; (3.) *Portulaca*." A comparison with the following enumeration reveals the fact that Osbeck nearly, or perhaps quite, exhausted the indigenous phanerogamic flora of the island! Indeed, we have no positive proof that more than two of the flowering plants are really indigenous. They are *Hedyotis adscensionis* (*Sherardia fruticosa*), and *Euphorbia origanoides*; both are endemic, and perhaps the remnant of a flora that is extinct, save these two species, so far as the flowering plants are concerned; yet it should be remembered that they belong to very widely diffused genera. Among vascular cryptogams there are two endemic ferns, namely, *Nephrodium ascensionis* and *Gymnogramme ascensionis*, the former being most nearly allied to the endemic St Helena species, and the latter not very different from the widely diffused *Gymnogramme leptophylla*, and even nearer the American *Gymnogramme chærophylla*. In 1867, Mr Baker[1] enumerated seven ferns as the total number then known to inhabit Ascension. In the following enumeration are eleven species; the additional ones being *Blechnum australe*, *Asplenium dentatum*, *Nephrodium molle*, and *Ophioglossum vulgatum*. The first was sent to Kew in 1875 by Mr Alex. Blake, without, as far as we have been able to ascertain, direct evidence of its being wild in the island; the second is given on the authority of Bory;[2] the third is almost ubiquitous in warm countries, and may have been carried with some of the numerous plants introduced from time to time for cultivation, while the fourth may be reckoned with the undoubtedly indigenous plants. On the whole, as Mr Baker observes, the ferns of Ascension exhibit a want of any decided characteristic. Altogether, however, the indigenous vegetation is so exceedingly meagre that it offers nothing for consideration from a phyto-geographical standpoint, except a possible relation to the flora of St Helena, briefly discussed below. Darwin[3] says: "Near the coast nothing grows; further inland an occasional green castor-oil plant, and a few grasshoppers, true friends of the desert, may be met with. Some grass is scattered over the surface of the central elevated region, and the whole much resembles the worse parts of the Welsh mountains. But, scanty as the pasture appears, about six hundred sheep, many goats, a few cows and horses, all thrive well on it."

Wallace has merely a passing allusion to it in his Island Life; and Sir Joseph Hooker, in his interesting essay on insular floras,[4] sums up the vegetation of Ascension in the following short paragraph. "The islet of Ascension claims a passing notice; it is much

[1] *Trans. Linn. Soc. Lond.*, xxvi. p. 347.

[2] In Duperr. Voy. "Coquille," Bot. Crypt., p. 270.

[3] *Journal of Researches*, p. 492.

[4] Lecture on Insular Floras, delivered before the British Association for the Advancement of Science at Nottingham in 1866.

smaller than St Helena, and 600 miles north-west of it. St Helena has been called a barren rock, but it is a paradise as compared with Ascension, which consists of a scorched mass of volcanic matter, in part resembling bottle-glass, and in part coke and cinders. A small green peak, 2800 feet above the sea, monopolises nearly all the vegetation, which consists of Purslane, a grass, and a Euphorbia in the lower parts of the island, whilst the green peak is clothed with a carpet of ferns, and here and there a shrub, allied to, but different from any St Helena one.[1] There are nine ferns, of which no less than six differ from those of St Helena, and three[2] of them are entirely confined to the islet."

A number of exotic plants have become naturalised in Ascension, and some of them are more prominent than the native plants. A. Richard[3] enumerates about twenty-five, but many of them were probably found only in cultivated ground. Excluding the probably introduced species contained in the following enumeration, a few others are more or less fully established, among them *Senebiera didyma*, *Oxalis corniculata*, *Urena lobata*, *Ageratum conyzoides*, *Solanum nigrum*, *Physalis*, sp., and *Plantago lanceolata*. Richard states that the Physalis covered all the higher parts of the island, and the fruit was much sought after by the inhabitants.

Previously to 1815 Ascension was uninhabited, but from that date there has always been a small population, and more or less cultivation. It was not, however, till 1857 that serious steps were taken to test the cultural capabilities of the island. A skilled gardener superintended the operations, and his success, in spite of droughts, was greater than had been anticipated. Planting was extensively carried out, and, as we learn from reports by Captain Barnard in 1862 and 1864, considerable numbers of a variety of trees and shrubs were in a flourishing condition, and many of the ravines were clothed with blackberry, furze, and other shrubs. In certain parts the soil was of sufficient depth and fertility to yield good crops; but we are not aware that any discoveries were made that would prove that there was ever a more varied and luxuriant indigenous vegetation. In consequence partly of the diversion of the ocean traffic through the Suez Canal, the importance of the island has decreased, and in consequence there is now little cultivation.

On the Community of Origin of the Plants of Ascension and St Helena.

As Wallace says in his Island Life, it is much more philosophical to assume a common origin of the organisms of remote countries than to try to prove a former direct connection between them. There is little, indeed, in the following enumeration to suggest either; but the slight evidence offered below of three plants, supposed to be endemic in St

[1] It should be mentioned that *Hedyotis adscensionis* is more nearly related to African and Asiatic species than it is to the St Helena *Hedyotis arborea*.

[2] That is, if we regard *Pteris flabellata* β *ascensionis* as a distinct species.

[3] Sertum Astrolabianum, pp. 54–56, 1834.

Helena, having also been found in Ascension deserves examination and discussion in this place.

Commidendron rugosum, DC., one of the St Helena small arboreous *Compositæ*, is recorded from Ascension by a no less competent and trustworthy authority than Burchell, who spent five years in St Helena, and was perfectly familiar with every plant. This record was first published, in an abbreviated form, in Hooker's Icones Plantarum, xi. p. 45, and subsequently copied by Melliss in his St Helena. It was first copied from a note, in Burchell's handwriting, on the back of a drawing of *Commidendron rugosum* in the collection of Burchell's drawings of plants, scenery, &c., of St Helena, in the Herbarium library at Kew. The whole note runs thus: "This plant was found growing wild in the Green Mountain at Ascension, but very scarce, and furnishes the principal food for the wild goats. 26. 1. 17." This is written beneath the original inscription: "Scrubwood or gum-shrub, from between Longwood and Gregory's. 18. 5. 1810." In Burchell's manuscript there is evidence that he was at Fulham in 1817, and within a fortnight of the date given, so that it must have been written from memory or copied from some other document. When he was at Ascension, if ever, we have not been able to ascertain; the only mention of the island in his voluminous manuscript notes at Kew that we have seen is the one in question. But Burchell was so exceedingly exact in all his entries, and so thoroughly reliable in everything that can be verified, that we cannot reject his testimony, simply because it has not been corroborated.

The second plant is *Wahlenbergia linifolia*, ADC., which De Candolle himself[1] records from Ascension thus: "In Sancta Helena (L. Banks! Lindl.! Kunth!) et in ins. Ascensionis (Herb. Mérat!)."

The third is *Nephrodium cognatum*, Hook., recorded by Kuhn (Filices Africanæ, p. 128) from Ascension, in Hb. Miquel. Of course it should be kept in view that all three of these records may be wrong; still, the probabilities of a common origin of the vegetation of the two islands are sufficiently strong to justify the publication of the slenderest evidence bearing thereon. The recent discovery in South Trinidad, by Dr Ralph Copeland, of *Asplenium compressum*, a distinct species of fern previously only known from St Helena, may be adduced as another possible link in the chain of evidence of these islands having derived their vegetation from the same source. It has already been mentioned that the Ascension and St Helena species of *Hedyotis* are as dissimilar as any two species of this large genus, and it may be added of the Ascension endemic *Euphorbia origanoides* that its nearest ally is *Euphorbia trinervia* from the Guinea coast, while the genus *Euphorbia* is not represented in the flora of St Helena by any certainly indigenous species. On the other hand, of the fourteen vascular cryptogams found in Ascension, seven also occur in St Helena, and one is more nearly related to endemic St Helena species than to any others.

[1] Prodromus Syst. Nat. Reg. Veg., vii. p. 438.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

CARYOPHYLLACEÆ.

Polycarpon tetraphyllum, Linn., f.

Polycarpon tetraphyllum, Linn., f.; DC., Prodr., iii. p. 376; Oliver, Fl. Trop. Afr., i. p. 144.

ASCENSION.—Indigenous? *Hooker.*

This almost ubiquitous plant in maritime districts was not one of those collected by Osbeck, but it has perhaps as good a claim to be considered indigenous as *Aristida ascensionis* or *Portulaca oleracea*.

PORTULACEÆ.

Portulaca oleracea, Linn.

Portulaca oleracea, Linn., Sp. Pl., ed. i., p. 82, sub *Aristida*, et p. 445, et Amœn. Acad., vii. p. 505; DC., Prodr., iii. p. 353; Oliver, Fl. Trop. Afr., i. p. 148.

ASCENSION.—Indigenous? *Osbeck; Sparrman; Hooker, &c.*

This plant is common on nearly all sandy sea-shores in tropical and subtropical countries, and it seems very probable that its seeds or even branches are conveyed by the waves from shore to shore, for it is found in the most remote and unfrequented places. It is apparently one of the first flowering plants to invade the coral islets, and it will grow close to the water's edge. There is a specimen in Kew Herbarium from Mangaia, South Pacific, collected by the Rev. Mr Gill, who notes on his label: "Grows on dead coral close to water's edge." It grows perhaps equally well inland; and, as it is a cultivated plant, its present wide area of distribution is doubtless partly due to that fact. Unless it belonged to the ancient flora of Ascension and St Helena, which is not probable, its presence in these islands is more likely to be due to the agency of man. Nevertheless, it is of interest to reproduce the earlier records of its existence. As already mentioned, it was one of the four flowering plants collected by Osbeck in Ascension about 1750; and Sparrman observed it in 1776, as we learn from his Iter in Chinam (Amœnitates Academicæ, vii. p. 505). Thus: "Maii 11. Anchora jacta est ad insulam St Helenæ, ubi Portulacæ oleraceæ ingens copia sponte crescebat. Maii 25. Ad insulam Adscensionis pervenimus, ubi in littore numero 79 Testudines Mydas cepimus et Portulacam oleraceam collegimus."

RUBIACEÆ.

Hedyotis adscensionis, DC. (Plate XVI.)

Hedyotis adscensionis, DC., Prodr., iv. p. 419.

Sherardia fruticosa, Linn., Sp. Pl., ed. i. p. 103, et ed. 2, p. 149; Forst. in Comment. Gœtt., ix. (1787) reprint, p. 40.

Ascension.—Endemic. *Osbeck; Lesson; Hooker; Seemann; Moseley.*

Osbeck collected the plant which Linnæus described under the name of *Sherardia fruticosa*, and there is no doubt that De Candolle's *Hedyotis adscensionis* is the same species, though there are great discrepancies in the description. Linnæus had a stunted specimen, like that represented in our figure B, in which the flowers are solitary and almost sessile. De Candolle had a specimen in which the peduncles were one-flowered and shorter than the flowers. In more robust specimens, collected by Seemann, the peduncles are often two-flowered, and the peduncle and pedicel together are twice or nearly three times as long as the flowers. The plant is not only very variable in the degree of scabridity, in the size of the leaves, length of the peduncle, and in the sizes of the flowers, but the latter are also dimorphic, differing in the relative lengths of the calyx lobes and the corolla tube, and also apparently in the position of the stamens. Whether these dimorphic flowers are functionally unisexual the accessible material is insufficient to determine, for the specimens are mostly quite past the flowering stage, and the others bear very few flowers, all of which are expanded and old. Both the long and short flowers have, however, exserted styles of about equal length.

EUPHORBIACEÆ.

Euphorbia origanoides, Linn. (Plate XVII.)

Euphorbia origanoides, Linn., Amœn. Acad., iii. p. 114, et Sp. Pl., ed. 1, p. 453; Forst. in Comment. Gœtt., ix. (1787), reprint, p. 46; Boissier in DC. Prodr., xv. pars 2, p. 15.

Ascension.—Endemic. *Osbeck; Hooker; Seemann; Curror; Moseley;* and in the British Museum collected by *Buchanan.*

MONOCOTYLEDONES.

CYPERACEÆ.

Cyperus umbellatus, Benth.

Cyperus umbellatus, Benth., Fl. Hongk., p. 386, et Fl. Austr., vii. p. 289.

Cyperus capito, Steud., Glumif. Cyp., p. 28.

Mariscus umbellatus, Vahl, Enum., ii. p. 376; Kunth, Enum. Pl., ii. p. 118.

Mariscus appendiculatus, Brongn. in Duperr. Voy. "Coquille," Bot. Phanerog., p. 178, t. 34 A.; Kunth, Enum. Pl., ii. p. 81.

Mariscus polycephalus, A. Rich., Sertum Astrolab., Bot., p. lii.?

Ascension.—Indigenous? *Lesson; Durville; Hooker.*

Widely dispersed in Tropical Asia and Africa, and also occurring in Northeast Australia.

There is little doubt that Richard's *Mariscus polycephalus* is correctly referred to this species, inasmuch as he cites *Mariscus polystachyus*, Brongn., Voy. "Coq.," t. 00, ined., from the same country, which is probably no other than *Mariscus appendiculatus*, Brongn.

Cyperus haspan, Linn.

Cyperus haspan, Linn., Sp. Pl., ed. 1, p. 45; A. Rich., Sertum Astrolab., pp. 50 et 54.

ASCENSION.—Indigenous? *Lesson.*

This species is very common and widely diffused in warm countries, but we have seen no specimen from Ascension.

JUNCACEÆ.

Juncus, sp., A. Rich.

Juncus, sp., A. Rich., Sertum Astrolab., p. 54.

ASCENSION.—Introduced? *Lesson.*

Kyllinga, sp.

Kyllinga, sp. (*Kyllinga monocephala*, Rottb.?)

ASCENSION.—Introduced? *Moseley.*

Common in Tropical Asia, Africa, and Australia; also occurring in St Helena, where, however, as here, it is probably a colonist. The specimen is stunted and in a young state.

GRAMINEÆ.

Aristida adscensionis, Linn.

Aristida adscensionis, Linn., Sp. Pl., ed. 1, p. 82; Forst. in Comment. Gœtt., ix. (1787), reprint, p. 39; Kunth, Enum., i. p. 190; Brongn. in Duperr. Voy. "Coquille," Bot. Phaner., p. 13.
Chætaria adscensionis, Beauv., Agrost., p. 30.

ASCENSION.—Indigenous? *Osbeck; Hooker; Moseley;* and *Buchanan* in the British Museum.

Generally diffused in the Canaries, Tropical and North Africa, Arabia, Madagascar, Rodriguez, Seychelles, &c.

The specimens that we have seen from Ascension are from three to ten inches in height, very strict in habit, with a close inflorescence, and altogether very different in aspect from most of the specimens so named. On the other hand, quite similar specimens come from Syria and Arabia.

Sporobolus durus, Brongn.

Sporobolus durus, Brongn. in Duperr. Voy. "Coquille," Bot. Phaner., p. 18, t. 4; Kunth, Enum. Pl., i. 1, p. 216.

ASCENSION.—Indigenous?

We have seen no specimen of any species of the genus *Sporobolus* from the island; but this must be very near if not the same, as the widely spread *Sporobolus virginicus*, a species likely to occur in such a situation.

Polypogon adscensionis, Trinius.

Polypogon adscensionis, Trinius, Agrostidea, ii. p. 11; Stendel, Gram., p. 183.

ASCENSION.—Indigenous?

Collected by Ecklon, and probably an introduced form.

Polypogon strictus, Nees.

Polypogon strictus, Nees in Linnæa, vii. p. 297; Kunth, Enum., i. p. 234.
Polypogon tenue, Brongn. in Duperr. Voy. "Coquille," Bot. Phaner., p. 22.

ASCENSION.—Indigenous?

Cape of Good Hope.

CRYPTOGAMÆ.—VASCULARES.

LYCOPODIACEÆ.

Psilotum triquetrum, Swartz.

Psilotum triquetrum, Swartz in Schrad. Journ. 1800, ii. p. 109, et Synop. Fil., p. 187; Spring., Monogr. Lycop., partie 2, p. 269; Kuhn, Fil. Afr., p. 187; Hook., Fil. Exot., t. 63.
Bernhardia dichotoma, Willd.; A. Rich., Voy. "Astrolabe," Bot., p. lii.

ASCENSION.—Indigenous. On the Green Mountain—*Hooker;* without locality—*Blake*, 1875; *Moseley; Lesson.*

Almost universally spread in warm countries, though it is not found in St Helena nor any of the other islands treated of in this work, except the Bermudas.

Lycopodium cernuum, Linn.

Lycopodium cernuum, Linn., Sp. Pl., ed. 1, p. 1103; Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 246; Swartz, Synop. Fil., p. 178; Spring., Monogr. Lycopod., partie 1, p. 79, partie 2, p. 37; Kuhn, Fil. Afr., p. 183.
Lycopodium boryanum, A. Rich., Sertum Astrolab. Bot., p. lii.

ASCENSION.—Indigenous. Sometimes densely matted with ferns, creeping and ascending the weather side of the Green Mountain, near the summit—*Hooker;* without locality—*Moseley. Lesson* also collected it.

Common and generally diffused in the tropics, and extending southward to St Paul's Island and New Zealand.

Lycopodium saururus, Lam.

Lycopodium saururus, Lam., Encycl. Bot., iii. p. 653; Swartz, Synop. Fil., p. 176; Baker MSS. in Herb. Kew.
Lycopodium insulare, Carmich. in Trans. Linn. Soc. Lond., xii. p. 509.

ASCENSION.—Indigenous. *Moseley.*

Widely spread in Africa and America, and common to a larger number of the Atlantic and Southern Islands treated of in this work than any other plant, being found in Ascension, St Helena, Tristan da Cunha group, Marion, St Paul, and Amsterdam Islands.

Fuller synonymy will be found in the following enumeration of the plants of St Helena.

FILICES.

POLYPODIEÆ.

Pteris incisa, Thunb.

Pteris incisa, Thunb., Prodr. Fl. Cap., p. 733; Swartz, Synop. Fil., p. 99; Hook., Sp. Fil., ii. p. 230; Hook. and Bak., Synop. Fil., p. 172; Kuhn, Fil. Afr., p. 82.
Pteris lessonii, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 276.
Pteris vespertilionis, Labill., Fl. Nov. Holl., ii. p. 96, t. 245.
Litobrochia incisa, Presl, Tent. Pteridogr., p. 149.

Ascension.—Indigenous. Covering many acres on the weather side of the Green Mountain at 1200 to 1800 feet—*Hooker*; without any remarks—*Curror; Seemann; Moseley.*

Very widely diffused in the tropics, and extending into the south temperate regions, including Tristan da Cunha and New Zealand. Kuhn records it from St Helena, but we have seen no specimens.

Pteris flabellata, Thunb., var. *ascensionis.*

Pteris flabellata, Thunb., Prodr. Fl. Cap., p. 733; Hook., Sp. Fil., ii. p. 185; Hook. and Bak., Synop., p. 161, var. *ascensionis.*
Pteris ascensionis, Swartz, Synop. Fil., pp. 100 et 294; Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 276.
Lonchitis? adscensionis, Forst. in Comment. Soc. Gœtt., ix. p. 72 (reprint, p. 62).
Pteris arguta, Ait., var. *β minor*, Mett. ex Kuhn, Fil. Afr., p. 77.

Ascension.—Clefts of rocks and shaded places on the Green Mountain at 1200 to 1800 feet—*Hooker*; without locality—*Curror; Moseley.*

The variety is apparently endemic in Ascension, while the species is common in St Helena, and has a wide range in Africa, extending to Bourbon and Rodriguez.

Blechnum australe, Linn.

Blechnum australe, Linn., Mantissa, i. p. 130; Swartz, Synop. Fil., p. 114; Hook., Sp. Fil., p. 56; Hook. and Bak., Synop. Fil., p. 186.

Ascension.—Indigenous?

There is a specimen in Kew Herbarium from Ascension, presented by Mr Alex. Blake in 1875, without any indication of locality, beyond Ascension, or other information. It

may have been taken from a garden, though its general distribution is not incompatible with its being wild. It is widely spread in South Africa, and also occurs in Madagascar, Bourbon, St Paul Island, and the Tristan da Cunha group. The American *Blechnum hastatum* can hardly be regarded as specifically distinct.

Asplenium dentatum, Linn.

Asplenium dentatum, Linn., Sp. Pl., ed. 1, p. 1080; Hook. and Bak., Synop. Fil., p. 196; Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 270.

Ascension.—Indigenous. *Durville.*

Bermudas; West Indies; Florida; Mexico; Guatemala.

We have seen no specimen of this fern from the island, and it is not taken up by Kuhn in his Filices Africanæ; but we include it entirely on the authority of Bory. It is such a very distinct species that there could hardly arise any error in its determination, though it is not improbable that Bory was mistaken respecting the country.

Asplenium lunulatum, Swartz.

Asplenium lunulatum, Swartz, Synop. Fil., p. 80; Hook. and Bak., Synop. Fil., p. 202.
Asplenium erectum, Bory in Willd. Sp. Pl., v. p. 328; Hook., Sp. Fil., iii. p. 126, t. 178.
Asplenium reclinatum, Houlst. and Moore in Gard. Mag. Bot., ii. p. 260.
Asplenium alatum, A. Rich. (non Willd.), Sertum Astrolab., p. 52?

Ascension.—Indigenous. Most abundant under the scrub and ferns on the weather side of the Green Mountain, also in crevices of rocks from an elevation of 1000 feet up to the summit—*Hooker*; without locality—*Lyall*, *Seemann*, and *Moseley*.

Generally spread in the tropics, except Australia, and extending as far southward as Tristan da Cunha. The form found in Ascension and Tristan da Cunha is small, reclinate, and usually proliferous. Kuhn (Fil. Afr., pp. 102 and 105) retains *Asplenium erectum* as distinct from *Asplenium lunulatum*, and refers the St Helena form to the latter species.

Nephrodium (Lastrea) ascensionis, Hook.

Nephrodium (Lastrea) ascensionis, Hook., Sp. Fil., iv. p. 124, t. 257; Hook. and Bak., Synop. Fil., p. 279; Kuhn, Fil. Afr., p. 126.

Ascension.—Endemic. On the Green Mountain, 1400 to 1800 feet, not very common—*Hooker*; *Seeman*; *Lyall*.

This fern, which is most nearly allied to the endemic St Helena *Nephrodium napoleonis* and *Nephrodium cognatum*, was not collected by Mr Moseley.

Nephrodium (Lastrea) molle, Desv.

Nephrodium (Lastrea) molle, Desv. in Mém. Soc. Linn. Par., vi. p. 258; Hook., Sp. Fil., iv. p. 67, *pro parte*; Hook. and Bak., Synop. Fil., p. 293; Kuhn, Fil. Afr., p. 136.

Ascension.—Indigenous? Without locality—*Moseley*.

Generally diffused in warm countries, and lately collected in St Helena, though it is in none of the earlier collections.

Polypodium trichomanoides, Swartz.

Polypodium trichomanoides, Swartz, Synop. Fil., p. 33; Schk., Krypt. Gewächse, i. p. 11, ii. t. 10; Hook., Sp. Fil., iv. p. 178; Hook. and Bak., Synop. Fil., p. 326.
β jungermannioides, Hook., Sp. Fil., l. c.
Polypodium planiusculum, Mett. ex Kuhn, Fil. Afr., p. 151.

ASCENSION.—The variety is endemic. Amongst moss on the summit of the Green Mountain, 2800 feet—*Hooker*.

We have only seen the specimens collected by Sir Joseph Hooker, but Kuhn records Hannemann as having collected the plant. Typical *Polypodium trichomanoides* has a wide range in Tropical Asia and America and in Polynesia. The Ascension plant wants the conspicuous hairs of the type.

Gymnogramme ascensionis, Hook.

Gymnogramme ascensionis, Hook., Sp. Fil., v. p. 137; Hook. and Bak., Synop. Fil., p. 383; Hook., 2d Cent. Ferns, t. 67.
Grammitis ascensionis, Hook., Ic. Pl., t. 967.

ASCENSION.—Endemic. Wet rocks and banks on the weather side of the Green Mountain, 1200 to 1800 feet—*Hooker*; without locality—*Moseley*.

MARATTIACEÆ.

Marattia purpurascens, De Vriese.

Marattia purpurascens, De Vriese, Monogr. Marat., p. 7, t. 3, fig. 19, t. 4, fig. 19; Kuhn, Fil. Afr., 175; Hook., Fil. Exot., t. 65; Hook and Bak., Synop. Fil., p. 441, under *Marattia fraxinea*.
Marattia ascensionis, J. Sm., Cat. Cult. Ferns, p. 79.
Marattia cristata, J. Sm., Cat. of Kew Ferns, p. 8.

ASCENSION.—Endemic. Very rare on the weather side of the Green Mountain, near the summit—*Hooker*; without locality—*Seemann*; *Moseley*.

Perhaps only a stunted state of *Marattia fraxinea*, Sm., which is common in Tropical and South Africa, in Tropical Asia and Polynesia, southward to New Zealand.

OPHIOGLOSSACEÆ.

Ophioglossum vulgatum, Linn.

Ophioglossum vulgatum, Linn., Sp. Pl., ed. 1, p. 1062; Hook. and Bak., Synop. Fil., p. 445.

ASCENSION.—Indigenous. Without locality—*Dr Murphy*.

This plant covers nearly the whole area of fern distribution. The variety found in Ascension has narrow fronds, and is quite unlike that from St Helena and Tristan da Cunha.

CRYPTOGAMÆ.—CELLULARES.

MUSCI.[1]

Dicranella (Campylopodium) ascensionica, Mitt.

Dicranella (Campylopodium) ascensionica, Mitt. in Melliss's St Helena, p. 357.

ASCENSION.—Endemic. *Seemann; Moseley.*

This species, which seems to replace the *Dicranella proscripta* of St Helena, is a little less robust and quite distinct in its leaves.

Campylopus introflexus, Mitt.

Dicranum introflexus, Hedw., Sp. Musc., p. 147, t. 29; C. Müll., Synop. Musc. Frond., i. p. 405.

ASCENSION. *Moseley.*

A widely dispersed moss.

Campylopus helenicus, Mitt.

Dicranum helenicus, C. Müll., Synop. Musc. Frond., ii. 599.

ASCENSION. *Moseley.*

Barren specimen with *Mastigophora leioclada*; determination uncertain, but the leaves correspond very nearly to the St Helena specimens.

Calymperes (Hyophilina) pulvinatum, Mitt.

Calymperes (Hyophilina) pulvinatum, Mitten, n. sp.

Cæspitosum, caulibus simplicibus foliis ambitu elongati lanceolatis fere ad medium erectis, et e cellulis hyalinis areolatis, inde patentibus apicibus acutiusculis vel nervo concolori dorso scabro in receptaculo gemmifero producto terminatis, margine crenulatis, limbo pallidiore infra apicem evanescente, cellulis minutis obscuris dorso minute papillosis areolatis.

ASCENSION.—Growing in a tufted manner on decayed wood; barren—*Moseley.*

The stems of this moss vary in the specimens from 1 cm. to 3 cm. in length, but as the foliage is not densely inserted they appear rather slender from the foliage shrinking very much when dry. In the size of the moss and in its leaves it comes near to *Calymperes moluccense*, but the erect lower part of the leaf is longer, although the vanishing limb is similar. From the African *Calymperes afzelii* it differs greatly in the outline of the leaf as well as in the papillation of its cells and scabrous nerve.

[1] By W. Mitten, A.L.S., with a few additional names from other sources.

Rhacopilum gracile, Mitt.

Rhacopilum gracile, Mitt, n. sp.

Caulibus ramulosis laxe cæspitosis gracilibus, foliis ut plurimis assurgentibus patentibus ovali-lanceolatis nervo viridi in aristam viridem lævem producto margine apicem versus minutissime crenulatis vel integerrimis, cellulis parvis ovali-rotundis distinctis areolatis, foliis stipulæformiibus minoribus lanceolato-subulatis.

Caulis inferne radiculosus. Folia viridia humida vix disticha sed patentia concava, sicca appressa.

ASCENSION. *Moseley.*

Differs from *Rhacopilum africanum*, Mitt., and from *Rhacopilum mucronatum*, Beauv., in the leaves not being distichously explanate, in the areolation composed of more distinct cells as well as in the more slender state of the entire moss.

A. Richard (Sertum Astrolabianum, pp. 51–52) enumerates the following mosses from Ascension :—*Dicranum filiforme*, P. Beauv. (*Dicranum capillaceum*, Bridel), *Dicranum fragile*, Hook., *Hypnum?*, *Bartramia?*, *Barbula flexuosa*, Bridel, and *Barbula atlantica?*, Bridel; and brief diagnoses of the following proposed new species of mosses from Ascension are published by Karl Müller in Engler's Botanische Jahrbücher (1884), v. pp. 83 and 84 : *Bryum* (*Eubryum*) *zygodontoides*; *Bryum* (*Apalodictyon*) *rubro-costatum*; *Bryum* (*Argobryum*) *argentatum*; *Dicranum* (*Campylopus*) *naumanni*; *Bartramia* (*Philonotula*) *subolescens*; *Calymperes* (*Hyopholina*) *ascensionis*; *Barbula* (*Hyophiladelphus*) *leucochlora*; *Barbula* (*Hyophiladelphus*) *cuspidatissima*; *Rhacopilum naumanni*; *Hookeria* (*Callicostella*) *ascensionis*.

These mosses were collected by Dr Naumann, who was attached to the Prussian "Gazelle" Transit Expedition.

HEPATICÆ.

Jungermannia biapiculata, Tayl.

Jungermannia biapiculata, Tayl. in Hook. Lond. Journ. Bot., 1845, p. 81; G. L. et N., Synop. Hepat., p. 666.

ASCENSION.—Endemic. *Hooker.*

Jungermannia (Fegatella) limbata, Tayl.

Jungermannia (Fegatella) limbata, Tayl. in Hook. Lond. Journ. Bot., 1845, p. 95.

ASCENSION.

Mastigophora (Sendtnera) leioclada, Mitt.

Mastigophora (Sendtnera) leioclada, Mitt. in Melliss's St. Helena, p. 370.
Jungermannia leioclada, Tayl. in Hook. Lond. Journ. Bot., 1845, p. 85; G. L. et N., Synop. Hepat., p. 723 (*Sendtnera*).

ASCENSION.—Endemic. *Hooker; Moseley.*

The specimens exactly agree with those originally collected; they are found growing amongst *Campylopus*.

It is not improbable that they are a small or young state of the *Mastigophora diclados* so often gathered in Mauritius.

Symphyogyna convoluta, L. G. et N.

Symphyogyna convoluta, L. G. et N., Synop. Hepat., p. 485; Melliss, St. Helena, p. 372.
Jungermannia convoluta, Tayl. in Hook. Lond. Journ. Bot., 1845, p. 94.

ASCENSION.—Endemic. *Hooker.*

Lejeunia pterota, Tayl.

Lejeunia pterota, Tayl. in Hook. Lond. Journ. Bot., 1845, p. 91; L. G. et N., Synop. Hepat., p. 367.
Lejeunia ascensionis, Tayl. ibidem fide Mitten in Melliss's St. Helena, p. 371.

ASCENSION. *Hooker; Moseley.*

Also in St Helena.

Lejeunia, sp.

Lejeunia, sp.

ASCENSION. *Moseley.*

A minute species creeping on *Calymperes*; it has acute leaves, a large inflated lobule, and tripartite amphigastria; it is in too incomplete a state to afford characters whereby it might be recognised.

Frullania ericoides, Nees.

Frullania ericoides, Nees; G. L. and N., Synop. Hepat., p. 417.

ASCENSION. *Lesson.*

West Indies; South America; Polynesia; India; Java.

Plagiochasma limbatum, Nees.

Fegatella limbatum, Tayl. in Hook. Lond. Journ. Bot., 1845, p. 95; L. G. et N., Synop. Hepat., p. 516.

ASCENSION. *Hooker.*

Also in St Helena.

Marchantia crassa, A. Rich.

Marchantia crassa, A. Rich., Voy. "Astrolabe," Bot., p. li.

ASCENSION. *Lesson.*

This name is apparently not taken up in the Synopsis Hepaticarum, and the plant may not belong here.

Targionia hypophylla, Linn.

Targionia hypophylla, Linn., ex Rich., Voy. "Astrolabe," Bot., p. li.

ASCENSION. *Lesson.*

This name is cited by G. L. and N. (Synop. Hepat., p. 575), as a variety of *Targionia michelii*, Corda, a very widely dispersed species.

LICHENES.[1]

LICHENACEI.

CLADONIEI.

Cladonia amaurocræa, Schær.

Cladonia amaurocræa, Schær., Spicil., p. 4; Nyl., Synop. Lich., i. p. 216.
Cenomyce oxyceras, Acharius, Synop. Lich., p. 264; A. Rich., Sertum Astrolab., p. 51.

ASCENSION. *Lesson.*

Europe; Asia; America; Australia.

ROCCELLEI.

Roccella tinctoria, DC.

Roccella tinctoria, DC., Fl. Franc., ii. p. 334; Nyl., Synop. Lichen., i. p. 258; Acharius, Lich. Univ., p. 439.

ASCENSION. *Dr C. Collingwood.*

Atlantic Islands, including St Helena, and widely dispersed.

Roccella phycopsis, Acharius.

Roccella phycopsis, Acharius, Lich. Univ., p. 440; Nyl., Synop. Lich., i. p. 259.
Roccella gracilis, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 239 ?.

ASCENSION. *Lesson; Durville; Hooker.*

Mediterranean region; Atlantic Islands, including St Helena; Peru; Madagascar.

[1] The Rev. J. M. Crombie furnished a list of the Lichens collected by Mr Moseley, and to these have been added a few others recorded by A. Richard in his Sertum Astrolabianum, pp. 50 et 51.

Ramalinei.

Ramalina pollinaria, Acharius.

Ramalina pollinaria, Acharius, Lich. Univ., p. 608; A. Rich., Sertum Astrolab., p. 51; Nyl., Synop. Lich., i. p. 296.

Ascension. *Lesson.*

Europe; Asia; Africa; West Indies; South America; St Helena.

This is included on the authority of Richard.

Ramalina polymorpha, Acharius.

Ramalina polymorpha, Acharius, Lich. Univ., p. 600, Synop. Lich., p. 295; Nyl., Synop. Lich., i. p. 293.

Ramalina implicata (errore pro emplecta, Acharius?) A. Rich., Sertum Astrolab., p. 51.

Ascension. *Lesson.*

Widely dispersed.

Usneei.

Usnea trichodea, Acharius.

Usnea trichodea, Acharius, Meth. Lich., p. 312, t. 8, fig. 1; Nyl., Synop. Lich., i. p. 270; A. Rich., Sertum Astrolab., p. 50.

Ascension. *Lesson.*

Nova Scotia; Cuba; Cape of Good Hope; Bourbon; New Zealand; Java.

Parmeliei.

Parmelia conoplea, Acharius.

Parmelia conoplea, Acharius, Synop. Lich., p. 213, ex A. Rich., Sertum Astrolab., p. 51.

Ascension. *Lesson.*

Parmelia saxatilis, Acharius.

Parmelia saxatilis, Acharius, Synop. Lich., p. 203; Nyl., Synop. Lich., i. p. 388; A. Rich., Sertum Astrolab., p. 51.

Ascension. *Lesson.*

Generally diffused.

Physciei.

Physcia leucomela, Michx.

Physcia leucomela, Michx., Fl. Bor.-Am., ii. p. 326; Nyl., Synop. Lich., i. p. 415, var. *angustifolia*; Mey. et Flot. in Nov. Act. Nat. Cur., xix., Suppl., i. p. 221; Crombie in Journ. Linn. Soc. Lond., xx. p. 83.

Borrera leucomela, Acharius, Lich. Univ., p. 499.

Ascension.—On the ground, amongst rocks—*Moseley.*

Widely spread.

Physcia pulverulenta, Fr.

Physcia pulverulenta, Fr., Lich. Europ., p. 79, ex Nyl., Synop. Lich., i. p. 419.
Parmelia pulverulenta, Acharius, Lich. Univ., p. 473, et Synop., p. 214; A. Rich., Sertum Astrolab., p. 51.

ASCENSION. *Lesson.*

Included on the authority of Richard, though Nylander gives the distribution as Europe, North Africa, and North America.

Physcia flavicans, DC.

Physcia flavicans, DC., Fl. Franc., vi. p. 189; Nyl., Synop. Lich., i. p. 406; Crombie in Journ. Linn. Soc. Lond., xx. p. 83.
Borrera flavicans, Acharius, Lich. Univ., p. 504; Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 238.

ASCENSION.—On rocks, &c.—*Lesson; Hooker; Moseley.*

Widely spread.

Physcia adscensionis, Crombie.

Physcia adscensionis, Crombie in Journ. Linn. Soc. Lond., xvi. p. 212.
Lecanora adscensionis, Acharius, Lich. Univ., p. 422, Synop. Lich., p. 179.

ASCENSION.

Mr Crombie enumerates this among the Lichens collected in the Cape Verde Islands by Mr Moseley.

In Kew Herbarium is a *Physcia*, probably *Physcia astroidea*, Fries, collected in Ascension by Dr C. Collingwood.

FUNGI.

We are not aware that a single species of this family has been collected in the island.

ALGÆ.

MELANOSPERMEÆ.

FUCACEÆ.

Sargassum lendigerum, K. A. Agardh.

Sargassum lendigerum, K. A. Agardh, Sp. Alg. i. p. 9; J. G. Agardh, Sp. Alg., i. p. 340; Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 125.
Fucus lendigerus, Linn., Sp. Pl., ed. 1, p. 1160; Turner, Hist. Fuc., t. 48.

ASCENSION.—Maritime rocks—*Hooker.*

Also collected by Durville, and the species was founded by Linnæus on a specimen collected at Ascension by Osbeck.

Shores of the Atlantic, and on the Pacific coast of South America.

Chordariaceæ.

Chordaria sordida, Bory.

Chordaria sordida, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 139; J. G. Agardh, Sp. Alg., i. p. 67.

Ascension. *Durville.*

An obscure species not identified by writers subsequent to Bory.

Rhodospermeæ.

Rhodomelaceæ.

Acanthophora muscoides, Bory.

Acanthophora muscoides, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 156; J. G. Agardh, Sp. Alg., ii. p. 816.
Acanthophora delilei, Harv., Nereis Bor.-Am., ii. p. 18.
Acanthophora militaris, Lamour., Ess., p. 44, t. 10, figg. 4 et 5.
Fucus muscoides, Linn., Sp. Pl., ed. 1, p. 1161.

Ascension. *Osbeck; Durville.*

Florida; West Indies; South Africa.

We have seen no Ascension specimens; yet the species was founded upon those collected there by Osbeck.

Ceramiaceæ.

Boryna compacta, Bory.

Boryna compacta, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 221.

Ascension. *Durville.*

An obscure plant, of which the above is the only record we have found. Bory states that it was intermixed with *Acanthophora muscoides.*

ST HELENA.

INTRODUCTORY NOTES.

St Helena is situated about 700 miles south of Ascension, and lies in lat. 15° 55′ S., and long. 5° 42′ W., or about 1100 miles from the coast of Africa, and 1800 miles from the nearest part of America. It is about ten miles long by eight miles broad, and is wholly volcanic, its surface being very rugged, irregular, and mountainous; and its greatest height is 2700 feet above sea-level. Nearly the whole of the coast-line consists of a wall of rock, rising in places to a height of 2000 feet, and broken only by narrow ravines that radiate from the centre of the island and increase in size and depth towards the coast. The estimated area of the island is 28,000 acres, whereof two-thirds at least are now waste.

The climate is described as one of the most equable and enjoyable in the world, being free from thunderstorms and hurricanes. The mean temperature for five years (1841 to 1845 inclusive) at Longwood, an altitude of 1764 feet, was 61·4° Fahr.; the lowest during this period was 52°, and the highest 77·6°; and the annual rainfall at the same place is about 44 inches. Descending towards the coast there is an increase of temperature with a smaller rainfall, and in Jamestown itself the heat is oppressive in summer. In the higher parts of the island there is a considerably larger rainfall than at Longwood, with, of course, a lower temperature.

Melliss[1] distinguishes three climatic zones characterised by different plants. The first is a rocky belt extending all round the coast and for a mile inland; it possesses a hot scorching atmosphere, 10° Fahr. higher in temperature than the mountain-top, and ranges in altitude from the sea-level up to 2272 feet. Except in the sheltered and watered ravines it is very barren.

The second or middle zone lies inside of the first, extending for three-quarters of a mile inland, and varying in altitude from 400 to 2000 feet. It is less rocky than the outer zone, its temperature is 5° Fahr. lower, and its vegetation is scanty.

The third zone consists of the centre of the island, an area about four miles long and two and a quarter miles wide, varying from 1200 feet to the highest summits. It has a deep soil, and is entirely covered with vegetation.

Vegetation—Historical Sketch.[2]

St. Helena was discovered by a Portuguese, Jean de Noya, in 1501, on the 18th of August, St. Helena's day, hence the name the island bears. At that date it was

[1] St Helena, p. 231.

[2] For many of the facts in this sketch we are indebted to Sir Joseph Hooker's Lecture on Insular Floras, read before the British Association for the Advancement of Science in 1866, and printed in the *Gardeners' Chronicle* for 1867.

entirely covered with forests, the trees drooping over the tremendous precipices that overhang the sea. Now nearly the whole of the indigenous vegetation has disappeared, except on the upper part of the Central Ridge, and is only very partially replaced by introduced plants, in consequence of the soil having been washed off from its rocky foundation since the destruction of the forests.

When the island was discovered, no mammals existed there, and vegetation dominated everywhere; but the great anxiety of the early voyagers to provide meat for future travellers, who, by design or accident, should visit such remote places, led to the introduction of hogs and goats; and the latter, chiefly, effected the destruction of the native vegetation. They were introduced in 1513, and multiplied so rapidly, that in 1588 Captain Cavendish states that they existed in thousands, single flocks being almost a mile long.

In 1709 trees still abounded, and one, the native Ebony (*Melhania melanoxylon*), in such quantities that it was used to burn lime with. In 1745, however, the governor of the island reported to the Court of Directors of the East India Company that the timber was rapidly disappearing, and that the goats should be destroyed for the preservation of the Ebony, and because the island was suffering from droughts. He was instructed not to destroy the goats, "as they were more valuable than Ebony."[1] Another century elapsed, and in 1810 another governor reports the total destruction of the great forests by the goats, which greedily devour the young plants and kill the old by browsing on their leaves and bark, and that fuel was so scarce that the Government paid for coal (and this in a tropical climate) £2729, 7s. 8d. annually. Still, even then, so great was the amount of seed annually shed, so rich the soil, and so rapid the growth of the native plants, that the governor goes on to say, that if the goats were killed and the island left to itself, it would in twenty years be again covered with indigenous vegetation.

About this time the goats were killed, but another enemy to the indigenous vegetation was at the same time introduced, and which has now rendered it certainly impossible that the native plants will ever again resume their sway. Major-General Beatson proposed and carried out the introduction of exotic plants on a large scale, the results of which are revealed in the continuation of this sketch.

It is not a little remarkable that, except in the general way indicated, almost nothing was known of the vegetation of St Helena before the beginning of the present century. The singular *Pelargonium cotyledonis* was introduced into English gardens as early as 1765, but when Linnæus described it in 1771, he recorded it as a South African plant, though its origin was known in this country. On the homeward route of his first voyage, Cook touched at St Helena and remained a few days; yet the botanists, the two Forsters, either collected very few plants or subsequently lost their collection, for in his report on the botany of the Atlantic Islands,[2] G. Forster cites only six species from St

[1] Tracts relative to the Island of St Helena, by Major-General A. Beatson. London, 1816.

[2] Plantæ Atlanticæ ex insulis Madeira, S. Jacobi, Adscensionis, S. Helenæ et Fayal Reportatæ in Comment. Soc. Gœtt., ix. (1787), pp. 13–74.

Helena, namely: *Anthoxanthum odoratum*, *Panicum crus-corvi*, *Alopecurus paniceus*, *Pentapetes erythroxylon*, *Psoralea aphylla*, and *Spilanthus arboreus*; and of these only two are indigenous. *Melhania melanoxylon*, and perhaps one or two more of the endemic plants, were imported and cultivated in this country towards the end of the last century, otherwise nothing further was known of the botany until the beginning of the present century. In 1805, Dr W. J. Burchell, who afterwards distinguished himself as a traveller in South Africa and Brazil, arrived at St Helena, where he remained until 1810; and during these five years he thoroughly botanised the island. Unfortunately for science, he never published anything, and scarcely allowed any naturalist access to any part of his herbarium. On his death, in 1865, his magnificent botanical collections, including the St Helena Herbarium, were presented by his sister to the Kew Herbarium; and Sir Joseph Hooker made use of it for the Lecture on Insular Floras referred to at the beginning of this sketch. The whole of Burchell's vast herbarium was in an excellent state of preservation, and it was supplemented by copious manuscript notes and descriptions of plants, especially of the St Helena plants. Indeed, there is a manuscript Flora Heleniana, written during his sojourn in the island, from which we have drawn much valuable information. This is only a fragment, yet it contains full and accurate descriptions of a considerable number of the endemic plants, with the names he proposed for them: and the bulk of them had at the date of his writing not been published. There is also a fine collection of sketches of the scenery of St Helena, and drawings of the plants, executed by Dr Burchell. This was presented to the Kew Library by Sir Joseph Hooker, to whom it was given by Miss Burchell when she became aware of the great interest he took in the flora of the island. The St Helena collection of dried plants consisted of 198 species of phænogams and ferns, and included all the indigenous plants known to exist, or to have existed, and several that are not represented, so far as we are aware, in any other collection. Dr Burchell, therefore, had collected full materials for a flora in the first decade of the century; yet hitherto no complete enumeration of the plants has been published, about half-a-dozen of them being described for the first time in this work. Nevertheless, nearly the whole of Burchell's descriptive work has been forestalled and his proposed names superseded. From St Helena, Burchell went to South Africa, where he travelled and collected for a period of five years; and the enormous collections he made there, and afterwards in Brazil, were perhaps the primary cause that prevented him from publishing a flora of St Helena.

Soon after Burchell left St Helena, another botanist appeared on the scene. This was Dr Roxburgh, the noted Indian botanist, who on his way home to England in enfeebled health, stayed in the island from the 7th of June 1813, to the 1st of March 1814. In spite of bad health, Roxburgh nearly exhausted the botany, and compiled a catalogue of the plants collected or seen, and described a large number of the indigenous plants for the first time. This catalogue was published as an appendix to Beatson's Tracts relative to the Island of St Helena, in 1816, after the author's death, or it would doubtless not have

appeared in such an imperfect form. A useful feature in this list is the distinction of indigenous and exotic plants, which is nowhere attempted by Burchell. Of the former category there are fifty-eight, including two or three obviously designated exotic by mistake. Besides the descriptive matter, the catalogue contains some interesting particulars of the relative frequency or rarity of a few of the species.

The naturalists of the French exploring expedition (Duperrey in "La Coquille"), 1822–1825, collected plants in St Helena; but the botany of the expedition was never completed, only the cryptogams and the grasses having been published, by Bory de St Vincent and Brongniart respectively.

Based upon Roxburgh's work, two mere lists[1] of the introduced and indigenous plants were published, but they are utterly devoid of botanical interest. A sketch of the flora appeared in Antomarchi's Derniers Moments de Napoléon (Paris, 1825). This we have not seen, but De Candolle, referring to the works just noticed, designates it[2] "la moins pitoyable des quatres Flores publiées jusqu'à présent." A fair estimate of its merits may be arrived at from the fact that forty-three species of ferns are enumerated without any indications of which are native, and so on in other orders.

Omitting the names of numerous small contributors of dried specimens of St Helena plants to Kew and the British Museum, which are cited under the plants they contributed, there is nothing of importance to note previous to 1840. In that year Dr (now Sir Joseph) Hooker, who was attached to Sir James Ross's Antarctic Expedition, had an opportunity of spending nine days on the island, and he made as complete a collection of the indigenous plants as he could at the season (Jan. and Feb.); yet he did not find one species that had not been previously collected, and several of those in the earlier collections had become so rare that he did not succeed in getting specimens. On the homeward voyage (May 1843) a few more days were spent on the island.

In 1851, H.M.S. "Herald" touched at St Helena, and Dr B. Seemann, the naturalist of the expedition, made a considerable collection of dried plants, which are at Kew.

Subsequent to the publication of his Lecture on Insular Floras, Sir Joseph Hooker described and figured a number of the more interesting St Helena plants,[3] and since then nothing of importance has appeared except Melliss's St Helena.[4] This work deals with every branch of natural history, as well as geology, meteorology, &c.; and it is a most interesting book, though, as might be expected where an author attempts so wide a range of inquiry, it is defective in some of its details. The botany is perhaps the least

[1] (1.) Flora Santa Helenica [Beatson], St Helena. Printed by J. Boyd, 1825.
(2.) An Alphabetical List of Indigenous and Exotic Plants growing on the Island of St Helena, compiled by Stephen F. Pritchard. Printed by G. J. Pike, 11 St George's Street, Cape Town, 1836.

[2] Geographie Botanique, ii. p. 1218 (1855).

[3] Hooker's Icones Plantarum, xi. (1867–71).

[4] St Helena: A Physical, Historical, and Topographical Description of the Island. By John Charles Melliss. London, 1875.

satisfactory part in some respects; but as it contains coloured figures of nearly all of the endemic plants, besides copious notes on their condition, it is by no means the least valuable. Mr Melliss resided in the island for some years, and during his residence he collected and transmitted to Kew specimens of all the endemic plants collected by Burchell, except perhaps about half-a-dozen. Unfortunately, Melliss followed Roxburgh's example, and included native and introduced plants in one general list, which is extended to 1058 species, so that the native element is as it were overpowered by the exotic. Then there is no attempt to elaborate the synonymy and exhaust the literature of each species, and a few species are omitted altogether. The *Cyperaceæ* and *Gramineæ* had not been critically examined, and several of the indigenous ones had not been described; hence the enumeration is imperfect for these orders. Apart from these defects, the work is most valuable and useful, and we are greatly indebted to the author for particulars respecting the distribution and relative rarity of a large number of the species up to the date of his work.

The only contribution to our knowledge of the flora of St Helena later than Mr Melliss's book is a collection of plants made by Mr D. Morris, Director of Public Gardens and Plantations in Jamaica, in 1883.[1] Mr Morris visited the island for the purpose of reporting to the Colonial Office on its agricultural resources, and during the little spare time he had, collected specimens of nearly all the native ferns as well as thirteen endemic flowering plants, and his name with the date affixed is cited under each of those plants.

Actual Condition of the Vegetation of St Helena—The Indigenous Element.

The present enumeration includes only such plants as may have reached the island by natural agencies; and these[2] may be classified in three groups, namely: certainly indigenous, probably indigenous, and doubtfully indigenous; those of the last category being mostly such generally diffused plants that it is impossible to say where they are really native. The numbers are:—

	Species.
Certainly indigenous	65
Probably „	24
Doubtfully „	5
Total	94

[1] A Report upon the Present Position and Prospects of the Agricultural Resources of the Island of St Helena, with a map showing the three zones of vegetation. By D. Morris. Colonial Office, 1884.

[2] Here, as in other comparisons, only the vascular plants are taken into consideration.

Tabular View of the Certainly Indigenous Vascular Plants of St Helena.[1]

FRANKENIACEÆ.

1. Frankenia portulacæfolia. Shrub.

STERCULIACEÆ.

2. Melhania melanoxylon. Tree.
3. Melhania erythroxylon. Tree, 20 feet.

GERANIACEÆ.

4. Pelargonium cotyledonis. Half shrub.

RHAMNEÆ.

5. Phylica ramosissima. Shrub, 12 feet.
6. Nesiota elliptica. Tree, 18 feet.

FICOIDEÆ.

7. Mesembryanthemum cryptanthum. Perennial herb.
8. Pharnaceum acidum. Half shrub.

UMBELLIFERÆ.

9. Sium burchellii. Perennial herb.
10. Sium helenianum. Perennial herb.

RUBIACEÆ.

11. Hedyotis arborea. Tree, 20 feet.

COMPOSITÆ.

12. Commidendron burchellii. Tree.
13. Commidendron spurium. Tree.
14. Commidendron robustum. Tree, 20 feet.
15. Commidendron rugosum. Tree, 10 feet.
16. Melanodendron integrifolium. Tree, 15 feet.
17. Psiadia rotundifolia. Tree, 20 feet.
18. Petrobium arboreum. Tree, 20 feet.
19. Senecio leucadendron. Tree, 12 feet.
20. Senecio prenanthiflora. Tree, 15 feet.
21. Tripteris burchellii. Annual herb.

CAMPANULACEÆ.

22. Lobelia scævolæfolia. Shrub.
23. Wahlenbergia angustifolia. Perennial herb.
24. Wahlenbergia linifolia. Half shrub.
25. Wahlenbergia roxburghii. Perennial herb.
26. Wahlenbergia burchellii. Perennial herb.

PLANTAGINEÆ.

27. Plantago robusta. Half shrub.

BORAGINEÆ.

28. Heliotropium pannifolium. Shrub.

SOLANACEÆ.

29. Mellissia begonifolia. Shrub, 8 feet.

EUPHORBIACEÆ.

30. Acalypha rubra. Shrub.

CYPERACEÆ.

31. Fimbristylis neglecta. Perennial herb.
32. Fimbristylis lichtensteiniana. Perennial herb.
33. *Scirpus nodosus.* Perennial herb.
34. Carex æquabilis. Perennial herb.
35. Carex prælta. Perennial herb.

GRAMINEÆ.

36. Agrostis simulans. Perennial herb.
37. Eragrostis saxatilis. Perennial herb.
38. Demazeria oblitera. Perennial ? herb.

LYCOPODIACEÆ.[2]

39. *Lycopodium saururus.*
40. *Lycopodium cernuum.*

FILICES.

41. Dicksonia arborescens. Tree, 20 feet.
42. Hymenophyllum capillaceum.
43. *Cheilanthes multifida.*
44. *Pteris flabellata.*
45. Pteris paleacea.
46. *Asplenium erectum.*
47. Asplenium nigro-paleaceum.
48. *Asplenium compressum.*
49. Asplenium platybasis.
50. *Asplenium furcatum.*
51. *Nephrodium patens.*
52. *Nephrodium molle.*
53. Nephrodium cognatum.
54. Nephrodium napoleonis.
55. *Polypodium lanceolatum.*
56. *Polypodium marginellum.*
57. Polypodium molle.
58. *Polypodium rugulosum.*
59. Gymnogramme haughtoni.
60. *Monogramme graminioides.*
61. Acrostichum dimorphum.
62. Acrostichum bifurcatum.
63. Acrostichum nervosum.
64. *Acrostichum conforme.*
65. *Ophioglossum vulgatum.*

[1] The names of the plants peculiar to the island are in Roman type.

[2] It is assumed that all the wild vascular cryptogams are indigenous.

Of the sixty-five species in the foregoing table, twenty-seven are vascular cryptogams, one of which is arboreous; and of the thirty-eight flowering plants, twenty are shrubs or small trees. The trees are all small, and some of them mere miniatures of trees; still they are called trees because they are not bushy.

With one exception, *Scirpus nodosus* (*Fimbristylis textilis*), the thirty-eight flowering plants are not only indigenous, but likewise endemic, having never been found in any other part of the world. The solitary exception has been admitted, because Roxburgh and other botanists who have visited the island have regarded it as one of the native plants. Out of twenty-seven vascular cryptogams, twelve are endemic—a proportion that is barely exceeded in an eminently fern flora like that of New Zealand.

The twenty-four probably indigenous species, or such as may have reached the island independently of human agency, are:—

Senebiera heleniana, Portulaca oleracea, Oxalis corniculata, Psoralea pinnata, Cotula coronopifolia, Ipomœa biloba, Dichondra repens, Boerhaavia verticillata, Suæda fruticosa, Exomis axyrioides, Euphorbia, sp., *Lemna minor, Juncus bufonius, Juncus lomatophyllus, Cyperus distans, Cyperus umbellatus, Cyperus lævigatus, Cyperus polystachyus, Cyperus difformis, Cyperus rotundus, Cyperus eragrostis, Kyllinga monocephala, Scirpus setaceus*, and *Sporobolus indicus*.

So far as some of the foregoing plants are concerned, the probabilities as to their being indigenous or introduced are pretty evenly balanced, while in other cases they preponderate against their being indigenous.

It has already been stated that the indigenous element of the present vegetation is now practically limited to, or at least only a prominent feature in it, high up in the Central Ridge; and this general statement needs very little qualification even if used in a more extended sense, as may be gathered from the remarks under each species. Still, in spite of the great rarity of many of the native species, fewer have disappeared altogether than might at first be supposed. By diligent search, Melliss rediscovered several that had been given up as wholly lost; and we have positive evidence of the absolute extinction of only two, namely, *Melhania melanoxylon* and *Acalypha rubra*, though the presumptive evidence is strong as to other two—*Heliotropium pannifolium* and *Demazeria oblitera*. How many were extirpated by the goats before the flora was investigated we shall never know: it may have been considerable, but judging from the facts before us and the characteristic poverty in species of insular floras generally, we should think not. Assuming that a portion of the flora has been lost, the remnant may be regarded as a representative sample of the whole.

The following extracts from Melliss's St Helena give a good idea of the condition of the indigenous vegetation during his residence in the island down to 1875:—

"The green vegetation once seen clothing the island to the water's edge, was doubtless, with some lost species, Ebony (*Melhania melanoxylon*), Scrubwood (*Commidendron rugosum*), *Frankenia, Mellissia*,

Plantago, *Mesembryanthemum*, *Pelargonium*, *Pharnaceum*, and *Tripteris*, these still occurring on the outer and lower zone near the sea, with perhaps the addition of the Rosemary (*Phylica ramosissima*) and Gumwood (*Commidendron robustum*), which now occupy an intermediate zone between the outskirts and the central highest parts of the islands, where all the rest of the remaining indigenous plants grow. This vegetation was probably so thick as to prevent the existence of grass, the absence of which is remarkable in the native flora,[1] only one species being found, and that confined to the high land.

"Viewing, in the present day, the dry, barren, soilless, frowning, lichen-coated, rocky outskirts of the island, it would require strong faith to realise its ever having been green with vegetation were it not that the record of such a fact is endorsed by the Ebony trunks and stems still existing where no vestige of life can now be found; and also by the manuscripts preserved at the castle, telling of localities where Ebony was gathered for fuel, and Gumwood felled for building purposes, where now no trace of either can be seen. Persons living on the island can also recollect losing their way in the Gumwood forests at Longwood, where now grassy plains with scarcely a tree exist.[2]

"Of the low land plants, the Scrubwood (*Commidendron rugosum*) is perhaps the most abundant now remaining; and next to that the *Frankenia*. Most of the others are found only as isolated individuals; but all of those which occupy the outer portion of the island are scarcer than *Phylica ramosissima* and *Commidendron robustum*, which are plants of the mid-altitude; and these in their turn are less plentiful than some of the high land species. The most abundant indigenous plant at present is undoubtedly the Whitewood Cabbage-tree (*Petrobium arboreum*); the Blackwood or Black Cabbage-tree (*Melanodendron integrifolium*) is the next; while next in order of quantity comes the He Cabbage-tree (*Senecio leucadendron*), followed by the She Cabbage-tree (*Senecio prenanthiflora*), with the Dogwood (*Hedyotis arborea*) perhaps taking the next position. Some species have dwindled down to a single plant; this is the case with *Psiadia rotundifolia*, which had almost been classed with the extinct species, until after long and patient search I experienced the great delight of finding one tree[3] of it in the Black field at Longwood Gate. It is an old tree, probably the only one alive anywhere, and likely soon to share the fate of the Ebony and Stringwood (*Acalypha rubra*), both of which, after much careful seeking for them, I am inclined to believe exist no longer.

"I saw the Ebony once about twenty years ago. It was growing in a garden on the high land, a miserable little plant only six inches in height, and yet it blossomed.

"The beautiful little Stringwood I last saw about fourteen years ago, growing as a carefully tended plant in the garden at Oakbank. It was only about eighteen inches high, though flowering freely."[4]

From the foregoing it is clear that the native element in the present vegetation, although still represented by at least sixty endemic species of vascular plants, without counting twenty-four others that are probably or possibly indigenous, is inappreciable, except in a few localities and especially high up in the Central Ridge.

[1] We recognise three native grasses, of which only one is at all common.

[2] From the manuscript records quoted by Melliss, we learn that if the goats and exotic plants introduced into St Helena are largely answerable for the destruction of the native vegetation, man himself is much to blame for completing it, for he certainly cut down large areas of the original forests.

[3] This still existed in 1883, when Mr Morris brought home a few branchlets bearing flowers.

[4] In the enumeration of the plants Melliss adds, "but is now no longer there."

The Exotic Element.

For details of the exotic element in the present vegetation of St Helena, we are almost wholly indebted to Melliss, who enumerates about 970 species, supplemented by remarks on their distribution, &c. Upwards of half of them are only cultivated, or are rare in a wild state, while others are only common in certain localities. The residue of thoroughly naturalised species is made up of plants from the most distant countries, the curious mixture reminding one more of a botanic garden than anything else. From the following list of the commoner species, it will be seen that European plants figure prominently in the scenery:—

Ranunculus sceleratus, Argemone mexicana, Fumaria capreolata, Capsella bursa-pastoris, Nasturtium officinale, Senebiera didyma, Hypericum hircinum, Cerastium glomeratum, Althæa officinalis, Malva sylvestris, Malva parviflora, Melia azedarach, Erythrina caffra, Medicago denticulata, Ulex europæus, Acacia longifolia, Acacia lophantha, Rubus pinnatus, Opuntia vulgaris, Ageratum conyzoides, Helichrysum bracteatum, Gnaphalium luteo-album, Senecio vulgaris, Cryptostemma calendulaceum, Hypochæris radicata, Sonchus oleraceus, Plantago major, Buddleia madagascariensis, Brugmansia suaveolens, Datura tatula, Datura fastuosa, Physalis peruviana, Solanum nigrum, Gomphocarpus fruticosus, Atriplex capensis, Chenopodium murale, Amarantus blitum, Achyranthes aspera, Cluytia pulchella, Euphorbia peplus, Ricinus communis, Urtica dioica, Quercus robur, Populus alba, Salix babylonica, Pinus pinaster, Richardia æthiopica, Coix lachryma, Paspalum scrobiculatum, Stenotaphrum americanum, Panicum maximum, Setaria verticillata, Gymnothrix caudata, Anthoxanthum odoratum, Poa annua, Cynodon dactylon, Eragrostis poæoides, Festuca bromoides, and *Bromus vestitus:* total, 59 species.

We have probably omitted a score or two of species that are equally as common as some of those we have enumerated; but our object is fully served by the selection given. Particulars respecting a few of those that are most striking in the landscape, and constitute the physiognomy of the vegetation, may be interesting.

Ulex europæus.—The English furze is perhaps the commonest shrub in the island, covering acres of the outskirts of the high land. It is used for fuel, and many natives make a living by cutting it and taking it into the town.

Rubus pinnatus.—A native of Africa and the Mascarene Islands, introduced in 1775,[1] and now exceedingly common everywhere above an elevation of 1500 feet.

Hypochæris radicata.—Europe, &c. Melliss says this plant is the dandelion of St Helena, where in meadows its yellow flower-heads are as thick as daisies in English meadows.

[1] On the authority of Melliss. Roxburgh states that the inhabitants regarded it as an introduced plant, though they disagreed as to its origin.

Buddleia madagascariensis.—One of the most abundant and objectionable plants in the island, and much used for hedging; but it soon overruns acres of land and climbs over the tallest trees.

Physalis peruviana.—Very common at altitudes of 1000 to 2000 feet, and yielding large quantities of fruit, which is collected and taken to market.

Chenopodium murale.—An abundant weed.

Rumex acetosella.—Common in meadows in the upper region.

Ricinus communis.—The castor-oil plant is very common from an elevation of 50 up to 1500 feet.

Quercus robur.—The oak was introduced in 1749, and thrives well on the high land, where, in the ravines and hollows, it gets sufficient shelter and depth of soil. It is abundant and grows side by side with the banana, the *Calla æthiopica*, and the bamboo; the latter, in some instances, may be seen shooting up through its branches and drooping over its topmost foliage. An oak-tree growing in the grounds at Government House, in 1875, measured twelve feet to the first branch and thirteen feet in circumference. Another measured ten feet to the first branch and twelve feet in circumference, and both were fifty feet high. The oak is one of the most thoroughly naturalised trees, bearing acorns abundantly.

Pinus pinaster and *Pinus sylvestris.*—The former, Melliss states, is much more abundant than the latter, being one of the commonest trees on the island. It grows freely, and produces seed which springs up without care. In various parts there were, in 1875, about two hundred acres thickly planted with this fir, which does not succeed, however, below 1500 feet. There were many trees upwards of sixty feet high, with straight, unbranched trunks, thirty or forty feet long, and ten feet in circumference.

Such is the composition of the present vegetation of St Helena, whose former flora is doomed to utter extinction, if some measures are not soon taken to preserve the meagre remains. In the report referred to above, Mr Morris suggests that the forest vegetation on the Central Ridge should be preserved and extended, if only for the sake of preventing the springs from drying up.

Origin of the Indigenous Vegetation of St Helena.

The indigenous plants of St Helena fall naturally into two groups or elements, ancient and modern; the former consisting entirely of endemic forms, though not comprising all the species which are apparently endemic in the island; and the latter, all those species enumerated on p. 55 as probably indigenous, together with such endemic species as *Mesembryanthemum cryptanthum*, *Tripteris burchellii*, *Agrostis simulans*, *Demazeria oblitera*, and perhaps some others. These plants have not the peculiar insular stamp characteristic of the plants which formerly constituted the bulk of the vegetation, and most likely they did not reach the island until a much later period. For the greater part,

they belong to types of the widest dispersion, which may have been introduced through the agency of man, direct or indirect; whilst others are maritime plants which owe their presence to the action of the sea. In treating of the origin of the flora of St Helena, we should, therefore, exclude this modern element and confine ourselves to the facts relating to the ancient element. Sir Joseph Hooker,[1] with practically the same facts before him (for the small accession of species in the present work could in no way modify them), was of opinion that, on the whole, the affinities of the flora were with the South African. "From such fragmentary data," he says, "it is difficult to form any exact conclusions as to the affinities of this flora, but I think it may safely be regarded as an African one, and characteristic of Southern extra-tropical Africa. The genera *Phylica*, *Pelargonium*, *Mesembryanthemum*, *Osteospermum* [*Tripteris*] and *Wahlenbergia* are eminently characteristic of Southern extra-tropical Africa, and I find amongst the others scarce any indication of an American parentage, except a plant referred to *Physalis*" [*Mellissia*].

In arriving at this conclusion Sir Joseph Hooker does not appear to have specially considered the arboreous *Compositæ*, some of which find equal or closer affinities among American types. They number nine species, and are here referred to five genera. At a later date, Mr Bentham, in his admirable essay on the *Compositæ*,[2] set forth his views of the relationships of the St Helena forms in the following words: "The expiring flora of the isle of St Helena is as remarkable in *Compositæ* as in other orders, in its distant connections. Although nearer to Africa than to any other continent, those denizen *Compositæ* which bear evidence of the greatest antiquity have their affinities for the most part in South America, whilst the colonists of a more recent character are South African. Seven endemic species[3] are known—*Commidendron*, four species, and *Melanodendron*, *Petrobium*, and *Psiadia*, one species each.[4] All, except one species of *Commidendron*, have more or less of the insular arborescent character. *Commidendron* and *Melanodendron* are among the woody Asteroid forms exemplified in the Antarctic-American *Chiliotrichium*, in the Andine *Diplostephium*, and in the Australasian *Olearia*. *Petrobium* is one of three genera, remains of a group probably of great antiquity, of which the two others are *Podanthus* in Chili and *Astemma* in the Andes. The *Psiadia* is an endemic species of a genus otherwise Mascarene, or of Eastern Africa, presenting a geographical connection analogous to the St Helena *Melhaniæ* with the Mascarene *Trochetia*."

From the foregoing it would seem that the ancient element in the indigenous vegetation is the remnant of a flora that was formerly spread over a wide area, and is now only represented in isolated distant spots; and that certain types of this flora, the

[1] Lecture on Insular Floras, reprint, p. 7.

[2] Notes on the History, Classification, and Geographical Distribution of the Compositæ, *Journ. Linn. Soc. Lond.*, (Botany) vol. xiii. p. 563.

[3] Including the annual *Tripteris burchellii*, there are ten endemic species.

[4] The two very remarkable species of *Senecio* are not taken into account.

arboreous *Compositæ* of the same tribe as the St Helena, for instance, are no longer found in South Africa, whatever their earlier distribution may have been. But the American affinity of some of them does not necessarily involve an American origin, for, as we shall show in our general introduction, the present distribution of arboreous *Compositæ* presents many anomalies. It should be borne in mind, too, that these *Compositæ* differ little in floral structure from the Cape shrubby *Feliciæ*. The flora of the Tristan da Cunha group exhibits similar, yet closer, affinities with the American flora on the one hand, and the Mascarene on the other; and associated with the plants of these affinities is a modern element comprising apparently endemic species of such genera as *Chenopodium*, *Atriplex*, *Rumex*, &c.

The following tabular view of the distribution and affinities of the genera of the endemic flowering plants of the island illustrates the peculiarities of the composition of the flora, and enables us at the same time to appreciate the difficulties to be encountered in an attempt to trace its origin to one source.

TABLE *Showing the Affinities of the Species and Genera and Distribution of the Genera of the Endemic Flowering Plants of St Helena.*

Name.	Affinities of the Species, &c.	Distribution of the Genera.
1. *Frankenia*	The St Helena species is so markedly distinct from all the others, that it was raised to the rank of a separate genus by Roxburgh.	Widely spread, including South Africa, most of the species being purely littoral.
2. *Melhania*	In habit the St Helena species closely resemble *Trochetia*, a genus confined to Mauritius and Madagascar; but the floral structure is quite that of *Melhania*.	Africa (including South), Asia, and Australia.
3. *Pelargonium* . . .	Very distinct.	Species very numerous in South Africa; one, or more, widely dispersed in the south temperate zone and two or three in North-East Africa and the Levant.
4. *Phylica*	Distinct.	A large genus confined to South Africa and the islands of the Atlantic and Indian Oceans.
5. *Nesiota*	Next to *Phylica*.	Endemic.
6. *Mesembryanthemum*	"Closely allied to *Mesembryanthemum nodiflorum* of North and South Africa."	Chiefly South African; also in Australia, New Zealand, Mediterranean region, and Arabia.
7. *Pharnaceum*	Differs from the other species in the entire stipules and very unequal sepals.	South Africa.
8. *Sium*	Not closely allied to any other species.	Three or four species having a wide range in the temperate zones of both hemispheres, including South Africa.
9. *Hedyotis*	Arboreous, and characterised by its unisexual flowers and short rotate corolla.	A large and widely dispersed genus, including South Africa.

Name.	Affinities of the Species, &c.	Distribution of the Genera.
10. *Commidendron* . .	Asteroid, near the American genera *Chiliotrichium* and *Diplostephium* and the Australasian *Olearia*.	Endemic.
11. *Melanodendron* . .	As the last.	Endemic.
12. *Psiadia*	A very distinct species.	East Africa and Mascarene Islands.
13. *Petrobium*	Next to the Chilian *Podanthus*.	Endemic.
14. *Senecio*	Two very distinct species, regarded by some botanists as constituting two independent genera.	Generally spread, including South Africa.
15. *Tripteris*	Allied to South African species.	Africa, almost wholly southern.
16. *Lobelia*	A distinct species.	Widely dispersed, South Africa inclusive.
17. *Wahlenbergia* . .	Allied to African and Juan Fernandez species.	Widely dispersed, with the greatest concentration of species in Africa.
18. *Plantago*	A very marked species.	Generally spread, including South Africa.
19. *Heliotropium* . . .	Habit and foliage of a *Tournefortia*, with floral structure of *Heliotropium*.	General in warm countries, including South Africa.
20. *Mellissia*	Shrubby, but otherwise nearly related to the American genus *Saracha*.	Endemic.
21. *Acalypha*	Allied to Mascarene species.	General in warm countries, including South Africa.
22. *Fimbristylis* . . .	No special affinities.	Widely spread, including South Africa.
23. *Carex*	With Mascarene and a Bermudan species.	Widely spread, including South Africa.
24. *Agrostis*	No marked characteristic.	Widely spread, including South Africa.
25. *Eragrostis*	A very marked species.	Widely spread in warm countries, including South Africa.
26. *Demazeria*	Closely allied to the South African *Demazeria acutiflora*.	Mediterranean region and South Africa.

Out of twenty-six genera, twenty are represented in South Africa, but sixteen of these have also a wider, and mostly a very wide, area of distribution; two are East African and Mascarene; and of the four endemic genera three have their greatest affinity among South American types, and the other one is nearest to the African *Phylicæ*.

The fact that recent explorations in Eastern Tropical Africa have brought to light several additional species of *Psiadia*, and the presence of many arboreous *Compositæ* in South America and Australia, as well as in South Africa and India, go to prove that this type is not essentially an insular one, though insular conditions seem favourable to its development and survival. Arboreous *Compositæ* are a prominent feature in the present floras of Juan Fernandez, the Sandwich Islands, Canaries, &c.; but in each case they belong to different tribes. Another point for consideration is the means by which these *Compositæ* were conveyed to the island. Their light pappose achenes are admirably adapted for wide dispersal, yet less so to such enormous distances than the seeds and seed-vessels of many other plants. But as we intend restricting these introductory notes on the vegetation of each island or group of islands mainly to the record of facts, we shall not pursue this inquiry farther in this place.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

RANUNCULACEÆ.

Ranunculus parviflorus, Linn., *β acutilobus*.

Ranunculus parviflorus, Linn., Sp. Pl., ed. 2, p. 780; *β acutilobus*, DC., Prodr., i. p. 42, fide R. T. Low in Herb. Kew.

St Helena.—Introduced? Wet places—*Burchell*; upland parts—*Hooker*; without locality—*Haughton*.

This widely dispersed plant is probably not truly indigenous, though it may have reached the island independently of the agency of man. Melliss does not include it in his enumeration; but he states that *Ranunculus sceleratus* is common. Roxburgh mentions *Ranunculus bulbosus*, which Melliss says is "grown in gardens only as a great rarity."

CRUCIFERÆ.

Senebiera heleniana, DC.

Senebiera heleniana, DC., Syst. Veg., ii. p. 523; Prodr., i. p. 202; Burchell, Ic. ined. t. 177.

St Helena.—Indigenous? In the sand near the lime quarry, Sandy Bay—*Burchell*, 124.

Allied to the common *Senebiera didyma*, and possibly only a modification of that species, which Melliss records as a troublesome weed. Burchell's specimens, however, the only ones we have seen, are almost woody, with the cauline leaves usually narrowly three-lobed, and have dark red or violet flowers, as represented in his coloured drawing; not white, as described by De Candolle. Melliss has not taken up the name.

["*Brassica heleniana*, Burch.," in DC. Prodr., i. p. 215, is certainly *Raphanus raphanistrum*. It is singular that the name should be ascribed to Burchell, because both in his MSS. enumeration of the plants of St Helena and on the label accompanying the specimens numbered 128, he has named the plant *Raphanus* sp.]

FRANKENIACEÆ.

Frankenia portulacæfolia, Spreng.

Frankenia portulacæfolia, Spreng., Syst. Veg., ii. p. 134; Hook., Ic. Pl., xi. t. 1058; Melliss, St Hel., p. 239, t. 25 (the dissections copied from Hooker).
Frankenia beatsonia, Schult. in Rœm. et Schult. Syst. Veg., vii. p. 70.
Beatsonia portulacæfolia, Roxb. in Beatson's St Helena Tracts, p. 300; DC., Prodr., i. p. 350.

St Helena.—Endemic. Rocks on Lot's Ridge—*Burchell*, 84; dry rocks—*Bennett*; Sandy Bay Barn—*Melliss*; without locality—*Morris*, in 1883.

"St Helena Tea."

"It still exists plentifully in the southern and eastern sides of the island, growing on the barren, dry, rocky ground near the sea-coast at altitudes of 500 to 1000 feet. It is most abundant at Sandy Bay Barn and near the Asses' Ears, and, excepting a few stray plants on the eastern side of the High Knoll, does not exist on the northern side of the island."—*Melliss*.

CARYOPHYLLACEÆ.

Polycarpon tetraphyllum, Linn.

Polycarpon tetraphyllum, Linn. f.; DC., Prodr., iii. p. 376; Oliver, Fl. Trop. Afr., i. p. 144.

St Helena.—Introduced? Common—*Burchell*; *Melliss*; *Lyall*.

Almost everywhere in temperate and subtropical regions where man has settled.

PORTULACEÆ.

Portulaca oleracea, Linn.

Portulaca oleracea, Linn., Sp. Pl., ed. 1, p. 445, et Amœn. Acad., vii. p. 505; Oliver, Fl. Trop. Afr., i. p. 148; Melliss, St Hel., p. 240.

St Helena.—Introduced? Common—*Roxburgh*; *Melliss*.

More widely diffused even than *Polycarpon tetraphyllum*; and Melliss expresses the opinion that it is indigenous in St Helena; but it is noteworthy that Burchell did not collect it. Plants of this class, that colonise so freely, must always occupy a doubtful position in relation to the indigenous element of the vegetation of a country. See remarks on this plant at p. 35 of this report.

STERCULIACEÆ.

Melhania melanoxylon, Ait.

Melhania melanoxylon, Ait., Hort. Kew, ed. 2, iv. p. 146; Melliss, St Hel., p. 245, t. 29.
Pentapetes erythroxylon, Bot. Mag., t. 1000, non Ait., Hort. Kew, ed. 1, ii. p. 438.
Dombeya erythroxylon, Andr., Bot. Rep., t. 389.
Dombeya melanoxylon, Roxb. in Beatson's St Helena Tracts, p. 307.
Trochetia melanoxylon, Benth. et Hook. f., Gen. Plant., i. p. 222.
Alcea arbor populnea, &c., Pluk., Almag. Mant., p. 6, et Amalth., t. 333, fig. 3.

St Helena.—Endemic. Barren rocks near the sea, and not far from Sandy Bay—*Roxburgh*; at Man and Horse and High Hill—*Burchell*.

"Native Ebony."

This tree appears to be quite extinct in the island, and probably no longer exists under cultivation. In Burchell's time it grew in the localities named above, and, according to his notes in Kew library, in a few others.

"This plant I believe to be now extinct. It formerly grew on the outer portions of the island near the coast, at altitudes of 1000 to 2000 feet, where the weatherbeaten stems are still found deeply embedded in the surface soil. The last plant I saw was a small one growing in the garden at Oakbank about twenty-five years ago, but it is not there now, and I have in vain searched the whole island over for another. The leaves were dark-green, and the flowers white; the wood is very hard, heavy, black in colour, and extremely brittle. It is still collected and turned into ornaments, which are much prized on account of its rarity. That this tree once formed a considerable portion of the vegetation, clothing the island on those parts that are now quite barren, is strongly evidenced by the many references to it in the local records."—*Melliss.*

Roxburgh mentions that he saw the ebony in two gardens only, where it had in many years grown to the height of only two or three feet, with many longer branches spreading flat on the ground, well decorated with abundance of foliage and large handsome flowers.

Melhania erythroxylon, Ait.

Melhania erythroxylon, Ait., Hort. Kew., ed. 2, iv. p. 146; Melliss, St Hel., p. 245, t. 28.
Pentapetes erythroxylon, Forst. in Comment. Soc. Gœtt., ix., reprint, p. 51; Ait., Hort. Kew, ed. 1, ii. p. 438.
Dombeya erythroxylon, Willd., Sp. Pl., iii. p. 725; Roxb. in Beatson's St Helena Tracts, p. 306.
Alcea arborea populi, &c., Pluk., Almag. Mant., p. 6, et Amalth., t. 333, fig. 1.
Trochetia erythroxylon, Benth. et Hook. f., Gen. Plant., i. p. 222.

St Helena.—Endemic. Longwood—*Burchell; Shuter;* without locality—*Bennett; Haughton; Lefroy;* Central Range—*Morris*, in 1883.

"Redwood."

This beautiful tree must soon share the fate of its congener. Melliss says—"One or two specimens still remain growing amongst the cabbage-trees, ferns, and other native plants in the glens near Diana's Peak and High Peak at 2500 feet. It is, however, very quickly disappearing, and ere long will probably become altogether extinct. Some cultivated specimens exist in gardens as low down as 1850 feet; but altogether not more than seventeen or eighteen plants are now to be found in the island; namely, two at Arnos Vale, one at Oakbank, three or four at Bowers's and Sandy Bay, two at Sam. Alexander's, one at Southen's, six or eight young trees at the Hermitage, one at Diana's Peak, and one at High Peak." From Burchell's manuscript we learn that it must have been tolerably plentiful in 1810; and Roxburgh states that in 1814 it still furnished the islanders with a hard, close-grained, mahogany-coloured, durable wood.

GERANIACEÆ.

Pelargonium cotyledonis, L'Heritier.

Pelargonium cotyledonis, L'Heritier, Geraniol., t. 27; Ait., Hort. Kew., ed. 1, ii. p. 428; Willd., Sp. Pl., iii. p. 674; DC., Prodr., i. p. 655; Melliss, St Hel., p. 250, t. 30.
Geranium cotyledonis, Linn., Mant., p. 569; Andrews, Geran., *cum icone*.
Isopetalum cotyledonis, Sweet, Geran., t. 126.
Erodium sempervivum, Roxb. in Beatson's St Helena Tracts, p. 308.

St Helena.—Endemic. Cole's Rock—*Burchell*, 129.

"Old Father live for ever" is the name applied to this plant by the islanders, in consequence of its power of retaining vitality for months without soil or water.

It was introduced into this country by Mr John Bush in 1765, and was cultivated in several gardens for many years, flowering freely, in some places at least. In a wild state it very rarely flowers, a few flowers collected by Burchell being the only ones we have seen. "It is now very rare, but still to be found at altitudes of 50 to 1000 feet clinging to the barren, exposed, rocky cliffs overhanging the sea-coast on the windward side of the island, where there is least soil and moisture. The colour of its stem is a chocolate-brown, considerably mottled by the grey lichens growing upon it, and so nearly resembles the dark basaltic cliffs and soil upon which it is found, that at the time when the plant is leafless it is most difficult to distinguish it from the rock upon which it grows. It seems to seek out the most inaccessible places, where there is no other vegetation—indeed, where nothing else would grow; and not without some risk are plants of it to be obtained. It throws out its leaves and white blossoms about May and June, after the summer rains; these soon die away again, leaving the plant for the most part of the year very much like a knotted mass of old fir-tree roots. It is now chiefly found on Sandy Bay Barn and Man and Horse Cliffs; and the only places inland where it occurs, and that very rarely, are Cole's Rock, in Sandy Bay, and at the eastern side of High Knoll—altitude, 1875 feet."—*Melliss.*

Linnæus described this plant in 1771, probably from cultivated specimens, and recorded it from the Cape of Good Hope, adding, "*Non dum mihi floruit.*"

Oxalis corniculata, Linn.

Oxalis corniculata, Linn., Sp. Pl. ed. 1, p. 435; DC., Prodr., i. p. 692; Melliss, St Hel., p. 252.

St Helena.—Introduced? Abundant all over the island—*Burchell; Hooker; Melliss.*

This plant is now universally spread, excepting in the colder regions; and it is impossible to determine where its presence is due to natural, and where to accidental causes.

ZYGOPHYLLEÆ.

Tribulus terrestris, Linn.

Tribulus terrestris, Linn., Sp. Pl., ed. 1, p. 387; DC., Prodr., i. p. 703; Melliss, St Hel., p. 252.

St Helena.—Introduced? Uncommon in the island. Near the lime quarry at Sandy Bay—*Burchell*, 102; only one plant, Prosperous Bay—*Melliss*.

Almost certainly an introduced plant in St Helena, where it does not seem to spread; yet it is elsewhere nearly as widely and generally diffused as *Oxalis corniculata*. In his manuscript notes Burchell adds to his own locality, "between Great and Little Stone Top, Rox."

RHAMNEÆ.

Phylica ramosissima, DC.

Phylica ramosissima, DC., Prodr., ii. p. 34; Hook., Ic. Pl., xi. t. 1051; Melliss, St Hel., p. 256, t. 32.
Phylica rosmarinifolia, Roxb. in Beatson's St Helena Tracts, p. 316, *nec aliorum*.

St Helena.—Endemic. Longwood, Lot, &c.—*Burchell*, 81; without locality—*Walker*.

"Wild Rosemary."

Forty years ago this was not an uncommon plant; but it has now become quite rare, and Morris did not collect it in 1883, though it most likely still existed. Melliss records the following facts concerning this plant:—"I have not seen it either above or below the altitudes of 1500 to 2000 feet; it grows mostly at Fairy Land, Plantation, Rosemary Hall, Oaklands, Oakbank, and other places of similar position, but its most remarkable locality is on the top of the pile of rock called Lot, where about a dozen large bushes of it seem to thrive without any soil. This plant is gradually disappearing; perhaps not more than a hundred specimens now exist."

Nesiota elliptica, Hook. f.

Nesiota elliptica, Hook. f. in Benth. et Hook. Gen. Plant., i. p. 380, et in Hook. Ic., xi. t. 1052; Melliss, St Hel., p. 256, t. 31.
Phylica elliptica, Roxb. in Beatson's St Helena Tracts, p. 316; DC., Prodr., ii. p. 34.

St Helena.—Endemic. Diana's Peak—*Burchell*, 82; *Hooker; Melliss; Morris*, in 1883; without locality—*Walker*.

"Wild Olive."

"This handsome indigenous plant, known as the Wild Olive of Diana's Peak, growing amongst the ferns and other native vegetation on the north side of the Central Ridge, attains to a stout shrubby tree, about fifteen or eighteen feet high. Very few trees now remain, probably not more than twelve or fifteen at the most, and these grow chiefly on

the northern side of the Central Ridge, where it is easily recognised by its deep grey foliage, in contrast with the pale green which characterises the other indigenous plants. Altitude, 2500 to 2600 feet."—*Melliss.*

LEGUMINOSÆ.

Psoralea pinnata, Linn.

Psoralea pinnata, Linn., Sp. Pl., ed. 1, p. 762; Roxb. in Beatson's St Helena Tracts, p. 319; Harv. and Sond., Fl. Cap., ii. p. 144 (*varietates plures*).
Psoralea arborea, Sims, Bot. Mag., t. 2090; Melliss, St Hel., p. 261.

St Helena.—Indigenous? In the more humid hills—*Burchell*, 137; common at elevations of 1800 to 2000 feet—*Melliss.*

"Christmas or Gobble Gheer."

Very widely spread, and common in South Africa. Burchell and Roxburgh seem to have regarded this small tree as being indigenous to St Helena, and Melliss says—"Doubtless this plant existed in the island on its discovery;" yet he gives no reasons justifying such an assertion. It is far more likely that it was introduced from the Cape early in the history of the island, and producing seed freely, soon established itself. Considering how common it is in South Africa, it is probable that it is disrelished by animals, and if so this would account for its becoming common in St Helena. The European furze has spread over the island, and is one of the most abundant plants, yet nobody would question its being an alien. Forster (Comment. Gœtt., ix. p. 54) records the common South African *Psoralea aphylla*, Linn., from St Helena, with the remark that it was probably introduced.

FICOIDEÆ.

Mesembryanthemum cryptanthum, Hook. f.

Mesembryanthemum cryptanthum, Hook. f. in Hook. Ic. Pl., xi. t. 1034; Melliss, St Hel., p. 241, t. 26.

St Helena.—Endemic. Prosperous Bay Plain—*Burchell*, 115.

"It grows in the hottest parts in the most barren and arid rocky soil, near the sea, in the neighbourhood of Sandy Bay beach and Turk's Cap Bay; and it is to be met with generally on the southern and eastern outskirts of the island."—*Melliss.*

Pharnaceum acidum, Hook. f.

Pharnaceum acidum, Hook. f. in Hook. Ic. Pl., xi. t. 1035; Melliss, St Hel., p. 242, t. 27.

St Helena.—Endemic. Sandy Bay—*Burchell*, 113; *Melliss;* without locality—*Haughton.*

"Longwood Samphire," Burchell.

Melliss says—"The only plant I know of now in the island grows on the pathway from Sandy Bay Lines to Horse's Head."

UMBELLIFERÆ.

Sium burchellii, Hemsl. (Plate XLVIII. C, figs. 5–7).

Sium burchellii, Hemsl.

Lichtensteinia burchellii, Hook. f. in Hook. Ic. Pl., xi. t. 1033 (incorrect as to the fruit); Melliss, St Hel., p. 278, t. 33.

St Helena.—Endemic. Diana's Peak—*Burchell*, 92; near Taylor's Flat to the westward of Diana's Peak—*Melliss*.

"Dwarf Angelica."

After a careful comparison of all the materials accessible, we have no doubt that this was erroneously referred to the genus *Lichtensteinia*, and we strongly suspect that it is not specifically different from *Sium helenianum*, but merely a stunted condition of that plant; yet, as we have only young fruit of *Sium burchellii*, we cannot be sure. There seems to have been some confusion of the two forms and perhaps a third. The obvious divergences of the two forms, whatever their rank, are in stature and in the length and shape of the fruit. *Sium burchellii* grows only three to five feet high, and has a longer, narrower fruit, with prominent, corky juga; while *Sium helenianum* grows from eight to twelve feet high, and has a shorter, thicker fruit, with less corky and more angular juga. These differences may be due to habitat, for *Sium helenianum* is said to grow amongst the "Cabbage-trees" and ferns in the ravines that traverse the mountain sides of Diana's Peak; whereas *Sium burchellii*, according to Melliss, inhabits the southern precipitous sides of the high central ridge, and is now very rare. The fruit of *Sium burchellii*, taken from the type specimens, has no vittæ under or in the juga; and the number of vittæ in the valleys is usually two, but varies from one to three in different fruits, or different valleys of the same fruit; when there is only one it is relatively large. In *Sium helenianum* the number of vittæ in each valley seems to be constantly three. Other reasons why we think they are forms of one species are—our inability to sort the specimens into two species, and the fact that neither Roxburgh nor Burchell, both of whom were good botanists (and the latter spent five years in the island), recognised more than one species. Further, Melliss sent specimens to Kew, collected by Mr Chalmers[1] near Diana's Peak, with the note, "appears to be different from *Sium helenianum* and *Lichtensteinia burchellii*." This intermediate form strengthens the view that the original types of the two forms are merely states of the same species. Loose fruits sent by Mr Melliss as *Lichtensteinia burchellii* are exactly the same as loose fruits sent by him under the name of *Sium helenianum*, and both the same as typical fruit of the latter; so he, we may infer, was unable to distinguish the supposed species on the spot. On the other hand, Mr D. Morris, who visited the island in 1883, was of opinion that there were two distinct species, though we may add he collected only one. Melliss's 46 has the following note: "This is the plant that Burchell gathered. It grows on the Central Ridge,

[1] Mr John Chalmers was sent out in 1868 to establish the Cinchona plantations, which have been since abandoned.

near Taylor's Flat, not far from Diana's Peak, at an elevation of about 2500 feet, amongst 'Cabbage-trees' and ferns. It is shrubby and rare, and I have seen only one or two plants, whereas the *Sium* is very abundant." This specimen has a short stunted stem with relatively small crowded leaves and no flowers or fruit.

The leaf of *Sium helenianum* represented in Hooker's Icones Plantarum, t. 1032, behind the inflorescence, is the only one with relatively finely toothed margins to the segments. Two other specimens collected by Melliss, and regarded by him as *Sium helenianum*, are portions of stem, about two feet long, bearing at the top leaves with as coarsely toothed margins as any of those of *Sium burchellii*. The specimen referred to, collected by Mr Chalmers, is in flower, and is so exactly like *Sium helenianum*, as represented in the Icones Plantarum, except that the leaves are more coarsely toothed, as to be indistinguishable. Ripe fruit is still wanting of the dwarf half-shrubby form (*Sium burchellii*), of which the only specimens bearing either flowers or young fruit are those collected by Burchell himself.

Sium helenianum, Hook. f. (Plate XLVIII. A, B, figs. 1–4.)

Sium helenianum, Hook. f. in Hook. Ic. Pl., xi. t. 1032; Melliss, St Hel., p. 279, t. 34.
Angelica bracteata, Roxb. in Beatson's St Helena Tracts, p. 297; DC., Prodr., iv. p. 169.

St Helena.—Endemic. High Peak and Diana's Peak—*Melliss; Morris*, in 1883.

"Angelica" or "Jelico."

This is much commoner than the form which has been distinguished as a species, but which we now think may be only a form of this. See the remarks under *Sium burchellii*.

[Roxburgh includes the widely-spread *Hydrocotyle asiatica*, Linn., in his enumeration, but neither Burchell nor any subsequent collector has met with it.]

RUBIACEÆ.

Hedyotis arborea, Roxb.

Hedyotis arborea, Roxb. in Beatson's St Helena Tracts, p. 310; DC., Prodr., iv. p. 422; Hook., Ic. Pl., xi. t. 1031; Melliss, St Hel., p. 282, t. 35 (section of the fruit incorrect).

St Helena.—Endemic. Diana's Peak, 2000 to 3000 feet—*Hooker*; Sandy Bay Ridge—*Burchell*, 64; without locality—*Seemann*, 2650; near Diana's Peak—*Melliss*.

"Dogwood."

Roxburgh, who first described this tree, about 1813, records it as "a native of the dark forests which decorate the misty alpine tops of the most lofty mountains in St Helena." Melliss states that it takes about the fifth place among the endemic plants for abundance, growing about twenty feet high on the high central ridge from Diana's Peak to High Peak, at an elevation of 2700 feet.

There are specimens in the British Museum Herbarium collected by J. Lind, M.D.

COMPOSITÆ.

In consequence of different botanists having employed the same specific names for two or more diverse plants, the synonymy of the St Helena *Compositæ* has been involved in great confusion, and therefore it may be useful to publish Burchell's manuscript tabulation of the synonymy deduced from a comparison of his unrivalled collection with the older collections in the British Museum. It will be seen from a comparison with our final synonymy that De Candolle mistook one or two of the plants which had previously been described under other names. Another cause of confusion was the transposition by Burchell himself of his numbers 154 and 157. That he did so is evident from the numbers attached to his specimens, and the names and numbers on his drawings of the two plants in the Kew Herbarium Library. With the exception of this emendation we print Burchell's manuscript verbatim, adding in brackets the names adopted in this work.

"*Compositæ arborescentes Insulæ Stæ Helenæ.*—Compared with those in Lambert's Herbarium, 4. v. '33. Compared with Forster's and Banks's and Roxburgh's plants at the British Museum, 9. v. '33.

152. Gumwood. *Commidendron vulgare*, B. [Commidendron robustum, DC.]
'Conyza arbor heleniodes, Plukenet, t. 345, fig. 7, *salvifolia.'*
Conyza salvifolia, Solander MS. in Herb. Banks.
Conyza gummifera et *Conyza robusta*, Roxb. Cat.
Conyza gummifera, Herb. Lamb. et Brit. Mus.
Conyza robusta, Roxb. ex DC.
Commidendron gummiferum, DC., Prodr., v. p. 344.

153. Scrubwood. . . . [Commidendron rugosum, DC.]
Conyza rugosa, Hort. Kew, ed. 1 (certe), ex speciminibus Kewensibus in Herb. Banks. asservatis.
Aster glutinosus, Roxb. Cat.; Herb. Lamb.; Plukenet, tab. 345, fig. 6, ubi pedunculus perperam ramosus depingitur.
Commidendron rugosum, DC., Prodr., v. p. 345.

154. . . . *cymosa*, B. [Commidendron spurium, DC.]
Solidago spuria, Forster, secundum iconem manu ejus depictam in Mus. Brit., cui addidit etiam nomen Aster olus.
Solidago spuria in specimine Forsteriano (ex Herb. Pallasii), autographo in Herb. Lam., ut etiam Aster olus.
Solidago spuria, Roxb. Cat., sec. descript.
Cacalia fraterna, Solander MS. in Herb. Banks.
Commidendron spurium, DC., Prodr., v. p. 344.

155. Bastard Cabbage-tree. [Melanodendron integrifolium, DC.]
Solidago integrifolia, sec. Herb. Lamb.
Melanodendron integrifolium, DC., Prodr., v. p. 280.

156. Red Cabbage-tree. . . . *prenanthiflora*, B. [Senecio prenanthiflora, Benth. et Hook. f.]
Cacalia spuria, } Solander MS. in Herb. Banks. *Cacalia spuria* is only a slight variety.
Cacalia materna, }
Mikania arborea, Roxb. Cat., sec. descript. ex DC.
Lachanodes prenanthiflora, DC., Prodr., v. p. 443.

157. White Cabbage-tree. [Senecio leucadendron, Benth. et Hook. f.]
Aster leucadendron, Forster in Herb. Lamb.
Solidago leucadendron (in ink) } Forster's drawings in Brit. Mus. in pencil, and a bad repre-
Aster pseudogummi (in pencil) } sentation.
Solidago leucadendron, Roxb. Cat. ex descript.
Lachanodes leucadendron, DC., Prodr., vi. p. 443.
158. . . . *conferta*, B. [Commidendron spurium, DC.]
Solidago cuneifolia, Roxb. sec. Herb. Lamb., where specimens of 157 [154] are under the same name.
Solidago gummifera, Roxb. ex DC.

[The last is a mistake, at any rate as to the Prodromus, where *Solidago cuneifolia* is doubtfully referred to *Lachanodes*.]

159. . . . *vernicata*, B. [Psiadia rotundifolia, Hook. f.]
Conyza glutinosa, Solander MS. in Herb. Banks.
Conyza rotundifolia, Roxb. sec. descript. in catal.
Commidendron rotundifolium, DC., Prodr., v. p. 344.
160. *Drimyphyllum helenianum*, B. [Petrobium arboreum, R. Br.]
Laxmannia arborea, Forster in Herb. Forst. in Mus. Brit.
Bidens arborea, Roxb. Cat. (planta fœm.)
Spilanthes tetrandra, Roxb. Cat. (planta mas.)
Petrobium, R. Br. in Trans. Linn. Soc., et DC."

—*W. J. Burchell*, MSS. in Bibl. Kew.

Commidendron burchellii, Benth. et Hook. f.

Commidendron burchellii, Benth. et Hook. f., Gen. Plant., ii. p. 277.
Aster burchellii, Hook. f. in Hook. Ic. Pl., xi. p. 44; Melliss, St Hel., p. 283, t. 36.

St Helena.—Endemic. Longwood—*Burchell*, 152, in part; near High Peak, at an elevation of 2500 feet—*Melliss*; without locality—*Wollaston*; Thompson's Wood—*Morris*, in 1883.

"Gum-tree."

Very rare, and almost extinct. Mellis found only one small tree of this species, and he believed it was the only one in existence. It was growing in a clump of *Commidendron gummiferus*, near the Old Picquet House, above West Lodge.

Commidendron spurium, DC.

Commidendron spurium, DC., Prodr., v. p. 344, sed non *Solidago spuria*, Forst., nec *Conyza arborescens*, Willd.
Aster gummiferus, Hook. f. in Hook. Ic. Pl., xi. t. 1056, cum var. β, non *Conyza gummifera*, Roxb., nec *Commidendron gummiferum*, DC.; Melliss, St Hel., p. 284, t. 38.
Solidago cuneifolia, Roxb. in Beatson's St Helena Tracts, p. 324.
Lachanodes cuneifolia, DC., Prodr., vi. p. 443.

St Helena.—Endemic. Thompson's Wood Hill—*Burchell*, 158; from the ridge above West Lodge—*Burchell*, 157; Central Peak, at High Peak, at 2700 feet—*Melliss*; Thompson's Wood—*Morris*, in 1883.

"Little Bastard Gumwood."

Very rare indeed according to Melliss, growing only at High Peak, and near the Old Picquet House, above West Lodge. In the British Museum are specimens collected by Forster and Robertson, 1773.

By an oversight the name *gummiferus* was applied to this plant in Hooker's Icones Plantarum. The error seems to have originated with Burchell, who incorrectly, in his manuscript tabulation of the synonymy of the St Helena *Compositæ*, reproduced at p. 70, cites De Candolle as reducing *Solidago cuneifolia*, Roxb., to *Solidago gummifera*, Roxb., whereas he doubtfully referred it to the genus *Lachanodes*.

Commidendron robustum, DC.

Commidendron robustum, DC., Prodr., v. p. 344; Melliss, St Hel., p. 284, t. 39.
Commidendron gummiferum, DC., *loc. cit.*
Aster roxburghii, Hook. f. in Hook. Ic. Pl., xi. p. 45.
Conyza robusta et *Conyza gummifera*, Roxb. in Beatson's St Helena Tracts, p. 304.

St Helena.—Endemic. Longwood—*Burchell*, 152; *Lady Dalhousie;* without locality—*Walker; Wollaston; Melliss.*

"Gumwood."

Melliss estimated the total number of gumwood trees in the island, in 1868, at about 1300 or 1400, and gave the approximate number in each locality where they grew. The principal are :—Longwood, Deadwood, and Lowe's Gardens, about 700 or 800; Man and Horse, about 50; Thompson's Wood, about 50; valley next to Shipway's, about 60; valley next to Rock Rose Hill, about 100; valley between Rock Mount and Peak Dale, about 100; and valley between Peak Dale and Lufkins, about 100. Formerly this was the most abundant tree in the island, and covered large areas. Roxburgh states that it grew on the more elevated parts of the interior of the island; but Melliss says it does not occur at a greater elevation than 1900 feet. We append his remarks on the distribution of this tree :—"The gumwood does not grow on the central and most elevated land where the native cabbage-trees and inhabitants of the cooler regions are found. Scarcely a tree exists at a greater altitude than 1900 feet above the sea; and there is still sufficient evidence to show that its habitat was on the now semi-barren slopes which stretch away to the sea-coast, and encircle the middle zone of the island—such as Longwood, Deadwood, Man and Horse, New Ground, and similar localities. Longwood and Deadwood, as their names imply, were originally covered with trees; nor is this the only evidence of their having been abundantly wooded, for natives still living on the island, as well as the records, tell of thick woods once covering those now grassy plains. Knowing this to be the case, there is no reason to doubt that other parts of the island, which now appear barren and so unlikely to support vegetation, were once also, down to the sea-cliffs, clothed with green woods, as stated by early visitors to the island."

Commidendron rugosum, DC.

Commidendron rugosum, DC., Prodr., v. p. 345.
Aster glutinosus, Roxb. in Beatson's St Helena Tracts, p. 300; Hook., Ic. Pl., xi. t. 1057; Melliss, St Hel. p. 283, t. 37. (*Aster rugosus* in tab.)
Conyza rugosa, Ait., Hort. Kew, ed. 1, iii. p. 184, non Vahl, et ed. 2, v. p. 30, excl. syn.

St Helena.—Endemic. Longwood—*Burchell*, 153; without locality—*Bennett; Haughton;* barren, rocky places—*Melliss;* St Helena Barn—*Morris*, in 1883.

"Scrubwood."

There are also specimens in the British Museum collected by Masson and Staunton.

Burchell states that the largest and most ancient trees were about Little Stonetop, and they were ten or more feet high.

The statement in Hooker's Icones Plantarum, xi. p. 45, and repeated in Melliss's St Helena, "also very rare in Ascension, Burchell MSS.," was copied from a note in Burchell's handwriting on the back of a drawing of the plant in the Herbarium library at Kew; and further particulars concerning it are given in our enumeration of the plants of Ascension.

Melanodendron integrifolium, DC.

Melanodendron integrifolium, DC., Prodr., v. p. 280; Hook., Ic. Pl., xi. p. 34, t. 1045; Melliss, St Hel., p. 286, t. 40.
Solidago integrifolia, Roxb. in Beatson's St Helena Tracts, p. 323.

St Helena.—Endemic. Diana's Peak and Sandy Bay Ridge—*Burchell*, 155; *Hooker*, 284; without special locality—*Walker; Bennett; Melliss.*

"Black Cabbage-tree."

At the present time this is the most abundant of all the native arboreous *Compositæ*.

Psiadia rotundifolia, Hook. f.

Psiadia rotundifolia, Hook. f. in Benth. et Hook. Gen. Plant., ii. p. 285; Melliss, St Hel., p. 286, t. 41.
Commidendron rotundifolium, DC., Prodr., v. p. 344.
Solidago rotundifolia, Roxb. in Beatson's St Helena Tracts, p. 324.

St Helena.—Endemic. Longwood—*Burchell*, 159; *Melliss; Morris*, in 1883.

"Bastard Gumwood" or "Cabbage-tree."

All the specimens we have seen are from the same locality. According to Melliss, only one tree of this species is now known to exist, and that grows in a field to the left of the entrance gates at Longwood called the Black Field. It is a tree about twenty feet high, and apparently very old. Burchell collected his specimens in 1806, and from his manuscript notes we learn that the largest and oldest trees then in existence were in "Shark's Valley, below Julio's." More writers than one, whom we quote in various

places, allude to the great fertility of the native plants in the production of seed, which grows freely where it is not choked by other plants. As an instance, it may be recorded here that the last tree of *Psiadia rotundifolia* bears good seed in plenty; and it is satisfactory to know that some brought home by Mr Morris in 1883 have germinated at Kew. It is to be hoped that success will attend the efforts to raise them, so that this interesting tree may be represented in botanic gardens, at least, for some years to come. With few exceptions, however, the plants of St Helena seem difficult to cultivate, for they languish under artificial conditions and die young.

Petrobium arboreum, R. Br.

Petrobium arboreum, R. Br. in Trans. Linn. Soc. Lond., xii. p. 113; DC., Prodr., v. p. 502; Hook., Ic. Pl., xi. p. 40, t. 1053; Melliss, St Hel., p. 287, t. 42.
Bidens arborea (fœm.), et *Spilanthes tetrandra* (mas.), Roxb. in Beatson's St Helena Tracts, pp. 301 et 325.
Spilanthus arboreus, Forst. in Comment. Soc. Gœtt., ix. p. 56.
Laxmannia arborea, Forst., Char. Gen. Pl., t. 47.

St Helena.—Endemic. Harding Spring—*Burchell*, 160; Central Ridge, at 2000 to 2600 feet—*Melliss;* without special localities—*Hooker; Cuming; Shuter; Bennett; Seemann;* and *Banks, Forster,* and *Robertson* in the British Museum Herbarium.

"Whitewood Cabbage-tree."

"One of the most abundant of the indigenous plants still remaining. It grows now chiefly on the south side of the high Central Ridge, extending from Diana's Peak to High Peak, at about 2600 feet."—*Melliss.*

Cotula coronopifolia, Linn.

Cotula coronopifolia, Linn.; Hook. f., Handb. Fl. N. Zeal., p. 141; Benth., Fl. Austr., iii. p. 549; Roxb. in Beatson's St Helena Tracts, p. 305; Melliss, St Hel., p. 288; Buchenau in Bot. Zeit. 1862, p. 25.

St Helena.—Indigenous? Ladder Hill, in the valleys about Sandy Bay, in Rupert's Valley, &c.—*Burchell*, 147; *Haughton.*

This plant is very widely spread in the southern hemisphere; also in Europe and North Africa, where, however, it it certainly a colonist.

Melliss states that it grows over the rocky outskirts of the island, and expresses the opinion that it existed in the island previous to its discovery; but the fact that another species (*Cotula australis*) has reached the island since Burchell's time, and become even commoner than the former, and at greater elevations, does not support this opinion.

Cotula coronopifolia is the "Pagoda flower" of the islanders; so named, Melliss says, from the resemblance of its flower-heads to a small gold coin, called a pagoda, of the value of four shillings, and current during the tenure of the East India Company.

Senecio prenanthiflora, Benth. et Hook. f.

Senecio prenanthiflora, Benth. et Hook. f., Gen. Plant., ii. p. 448.
Lachanodes prenanthiflora, Burch. in DC. Prodr., vi. p. 442; Hook., Ic. Pl., xi. t. 1054; Melliss, St Hel., p. 289, t. 43.
Milkania arborea, Roxb. in Beatson's St Helena Tracts, p. 313, non Kunth.
Solidago leucadendron, Willd., Sp. Pl., iii. p. 2054, non Forst.

St Helena.—Endemic. Half way up Diana's Peak and Sandy Bay Ridge—*Burchell*, 156; north slope of Diana's Peak, at 2500 feet—*Hooker*, 282; without locality—*Bennett*; Central Ridge—*Morris*, in 1883.

"She Cabbage-tree."

This still occurs rather plentifully on the Central Ridge at 2000 to 2600 feet. There are specimens in the herbarium of the British Museum brought home by Cook on his first voyage.

Senecio leucadendron, Benth. et Hook. f.

Senecio leucadendron, Benth. et Hook. f., Gen. Plant., ii. p. 448.
Pladaroxylon leucadendron, Hook. f. in Hook. Ic. Pl., xi. t. 1055; Melliss, St Hel., p. 289, t. 44.
Lachanodes leucadendron, DC., Prodr., vi. p. 443.
Solidago leucadendron, Forst., Comment. Soc. Gœtt., p. 59, ex Willd., Sp. Pl., iii. p. 2054; Roxb. in Beatson's St Helena Tracts, p. 323.

St Helena.—Endemic. Diana's Peak and Sandy Bay Ridge—*Burchell*, 154; Diana's Peak, at 2000 feet—*Hooker*; Central Ridge—*Melliss*; without locality—*Bennett*; Central Ridge—*Morris*, in 1883.

"He Cabbage-tree."

This forms, according to Melliss, a conspicuous part of the indigenous vegetation on the Central Ridge, growing at elevations of 1900 to 2600 feet, descending much lower than any of the other "cabbage-trees."

It is in the older collections at the British Museum, collected by Forster, Robertson (1773), and Staunton.

Tripteris burchellii, Hook. f.

Tripteris burchellii, Hook. f. in Melliss's St Hel., p. 290, t. 45.
Oligocarpus, Benth. et Hook. f., Gen. Plant., ii. p. 455.
Osteospermum, sp., Hook. f., Lecture on Insular Floras, reprint, p. 7.

St Helena.—Endemic. From the Waterfall, and the Gut under Lot's Wife, towards Sandy Bay—*Burchell*, 149; *Melliss*.

"A native of the rocky, barren land near the coast, where it grows with *Mesembryanthemum cryptanthum*. It springs up after the winter rains in July or August, blossoms and seeds freely, and dies in the following summer weather, about February or March. It is not abundant, and grows chiefly in the neighbourhood of Sandy Bay beach. I have

also gathered it near Flagstaff and Turk's Cap Valley, on the eastern side of the island, growing amongst the scrubwood bushes, and also on the cliffs at Wild Ram's Spring, about 1800 feet perpendicularly above the sea."—*Melliss.*

With the exception of one species north of the tropic and this Helenian species, the genus *Tripteris*, consisting of about twenty-five other species, is confined to South Africa.

CAMPANULACEÆ.

Lobelia scævolæfolia, Roxb.

Lobelia scævolæfolia, Roxb. in Beatson's St Helena Tracts, p. 312; DC., Prodr., vii. p. 357; Melliss, St Hel., p. 292, t. 46.
Trimeris oblongifolia, Presl. Prodr. Monogr. Lobel., p. 46.

St Helena.—Endemic. Diana's Peak and Sandy Bay Ridge—*Burchell*, 70; Diana's Peak, at 2000 feet—*Hooker;* Central Ridge, near Diana's Peak, at 2700 feet—*Melliss;* without exact locality—*Seemann; Shuter; Bennett; Wight; Cuming; Lady Dalhousie;* Diana's Peak—*Morris*, in 1883.

This still grows rather abundantly on the Central Ridge.

Wahlenbergia angustifolia, A. DC.

Wahlenbergia angustifolia, A. DC., Monogr. Camp., p. 162, et Prodr., vii. p. 438; Melliss, St Hel., p. 293, t. 47.
Wahlenbergia clivosa, A. DC., Monogr. Camp., p. 161.
Roella angustifolia, Roxb. in Beatson's St Helena Tracts, p. 320.

St Helena.—Endemic. High Peak, &c.—*Burchell*, 67; Diana's Peak, in stony places, at 2000 feet—*Hooker;* without locality—*Cuming; Lady Dalhousie; Bennett;* Central Ridge—*Melliss; Morris*, in 1883.

Melliss records this as rare on somewhat rocky banks along the Central Ridge, at 2000 to 2500 feet.

Wahlenbergia linifolia, A. DC.

Wahlenbergia linifolia, A. DC., Monogr. Camp., p. 162, et Prodr., vii. p. 438; Melliss, St Hel., p. 293, t. 48.
Roella linifolia, Roxb. in Beatson's St Helena Tracts, p. 321.
Wahlenbergia foliosa, A. DC., Monogr. Camp., p. 160, t. 14.

St Helena.—Endemic? Sandy Bay Ridge and Diana's Peak—*Burchell*, 68; Diana's Peak, at 2700 feet, common—*Hooker; Melliss; Morris*, 1883; without locality—*Seemann; Lesson; Cuming; Walker; Lady Dalhousie.*

Also recorded by De Candolle from Ascension, in Herb. Merat.

"Found at Diana's Peak, as well as generally and abundantly on the Central Ridge, amidst ferns and other indigenous plants, at altitudes of 2000 to 2500 feet."—*Melliss.*

There seems to be some confusion of the synonymy of this species and *Wahhlenbergia angustifolia*, to which A. De Candolle reduces his *Wahlenbergia clivosa*. In Kew Herbarium there is a specimen of undoubted *Wahlenbergia linifolia*, which was originally erroneously named *Wahlenbergia angustifolia*, and this specimen also bears the name "*Campanula clivosa*, herb. Banks," in A. De Candolle's own handwriting. On *Campanula clivosa*, herb. Banks non herb. Roxb., De Candolle founded his *Wahlenbergia clivosa*, which in the Prodromus he reduces to *Wahlenbergia angustifolia;* and *Campanula clivosa*, herb. Roxb. non herb. Banks, is cited as synonymous with *Wahlenbergia linifolia*.

Wahlenbergia roxburghii, A. DC.

Wahlenbergia roxburghii, A. DC., Monogr. Camp., p. 162; Prodr., vii. p. 438.
Roella paniculata, Roxb. in Beatson's St Helena Tracts, p. 320.

St Helena.—Endemic. Sandy Bay Ridge—*Burchell*, 69; without locality—*Walker; Melliss.*

Melliss omits *Wahlenbergia roxburghii*, and cites *Roella paniculata* as a synonym of *Wahlenbergia burchellii*. He may have intended to reduce the latter, for they are very much alike, if not the same species, and both Roxburgh and Burchell recognised only three species of this genus; but if they represent the same species, the name to retain is *Wahlenbergia roxburghii*.

Wahlenbergia burchellii, A. DC.

Wahlenbergia burchellii, A. DC., Prodr., vii. p. 438; Melliss, St Hel., p. 293, t. 49, excl. syn.

St Helena.—Endemic. Without number and locality—*Burchell; Walker; Wollaston;* near Taylor's Flat and Diana's Peak—*Melliss.*

"Rare in similar situations to *Wahlenbergia linifolia*."—*Melliss.*

PLANTAGINACEÆ.

Plantago robusta, Roxb.

Plantago robusta, Roxb. in Beatson's St Helena Tracts, p. 317; DC., Prodr., xiii. 1, p. 736; Melliss, St Hel., p. 296, t. 50.

St Helena.—Endemic. From the Waterfall—*Burchell*, 63; Wild Ram's Spring—*Melliss.*

"Now very scarce, but still to be found growing in crevices of rocks in the hottest parts of the island, at Wild Ram's Spring, Man and Horse, &c., on the south-western sea-coast cliffs, on the eastern side of High Knoll, and at the Waterfall; also at the Flagstaff Hill."—*Melliss.*

SOLANACEÆ.

Mellissia begonifolia, Hook f.

Mellissia begonifolia, Hook. f. in Hook. Ic. Pl., xi. t. 1021; Melliss, St Hel., p. 307, t. 51.
Physalis begonifolia, Roxb. in Beatson's St Helena Tracts, p. 317.

St Helena.—Endemic. Long Range Point—*Burchell*, 80; without locality—*Bennett*; Long Range, &c.—*Melliss*.

"Boxwood."

"An extremely rare plant, but still to be found growing on the south-eastern side of the island at Long Range and Stone Top."—*Melliss*.

Solanum, sp.

Solanum, sp. (aff. *Solano villoso*, Lam.)

St Helena.—Introduced? About Sandy Bay—*Burchell*, 78.

The specimen of this is insufficient for determination; it is not *Solanum nigrum*, and we have not been able to match it. We may add Burchell's description, drawn up from the living plant:—

"*Habitus Solani nigri*. *Caulis* erectus, ramosus; ramuli angulati, patuli, pubescentes. Folia ovata, acuta, lateribus angulatis vel grosse dentatis, crassiuscula, utrinque breviter hirsuta, venosa, alterna, patentia, in petiolum attenuata, flavescenti-viridia. *Cyma* extra-foliacea sub-4-flora, pedunculata, foliis brevior. *Flores* nutantes, minuti; calyx florifer ovatus, 5-dentatus; fructifer 5-fidus, laciniis brevibus obtusis, a bacca recedentibus. *Pedunculi* fructiferi dependentes. *Bacca* pisi magnitudine, pallide viridis, bilocularis; seminum receptaculum centrale, simplex; semina parva, pallida, compressa, simplici serie in orbem radiatim disposita."—Burchell MSS. in Bibl. Kew.

BORAGINEÆ.

Heliotropium pannifolium, Burchell.

Heliotropium pannifolium, Burchell MSS. in Bibl. Kew, n. sp.

"*Planta* fruticosa, 3-pedalis, multicaulis, foliosa, incana, in omnibus partibus villosa. *Caules* ramosi, foliosi, lignosi, cortice fusco. *Ramuli* dense villosi, teretes, foliosi, intus medulla farcti. *Folia* alterna, petiolata, oblonga, $1\frac{3}{4}$ poll. lata, $4\frac{1}{2}$ poll. longa, obtusa, basi cordata, superne reticulato-venosa, venis depressis, inferne reticulato venosa, venis prominentibus, utrinque molliter incano-pubescentia, patentia, recurvata, undulata, integerrima, crassiuscula et minime succulenta; petiolus validus, superne complanatus, stipulæ nullæ. *Cyma* pedunculata, terminalis, foliorum longitudine. *Flores* sessiles, parvi; calyx inferus, utrinque hirsutus, tubulosus, semi-quinquefidus, laciniis erectis obtusis oblongis tubum

corollæ æquantibus; corolla hypocrateriformis, fauce nudo, tubo extus hirsuto; antheræ quinque, oblongæ, in tubi fauce sessiles, inclusæ. *Pistillum* unicum, inclusum; stylus brevis; stigma capitatum, cum acumine bifido; germina quatuor."

"Obs. Facies potius *Tournefortiæ* quam *Heliotropii* sed ob germina quatuor ad posteriorem generum relata."

St Helena.—Endemic. "Sandy Bay, in convalle Broadgut dicta, rarissima"—*Burchell*, 65.

As Burchell states, this plant has much more the appearance of a *Tournefortia* than a *Heliotropium*, but although the flowers of the only specimen in Kew Herbarium are almost wholly destroyed by insects, we have been able to confirm his description of the ovary. There is a figure of the plant among Burchell's unpublished drawings at Kew.

It would seem to be one of the endemic plants that have become extinct, yet no description of it has previously been published.

CONVOLVULACEÆ.

Dichondra repens, Forst.

Dichondra repens, Forst., Char. Gener., p. 40, t. 20; Melliss, St Hel., p. 305; DC., Prodr., ix. p. 451.

St Helena.—Indigenous? Little Stonetop, &c.—*Burchell*, 90; common everywhere—*Melliss*.

One of the most universally spread plants in tropical and subtropical regions, and also in some temperate countries. From Burchell's manuscript we learn that this plant was common in the interior of the island during his time, and Melliss expresses an opinion that it is probably a native.

Ipomœa biloba, Forsk.

Ipomœa biloba, Forsk., Fl. Ægypt.-Arab., p. 44; Hook. f., Fl. Brit. Ind., iv. p. 212.
Ipomœa pes-caprœ, Sweet, Hort. Suburb. Londin., p. 35; Mart., Fl. Bras., vii. p. 256.
Convolvulus pes-caprœ, et *Convolvulus brasiliensis*, Linn., Sp. Pl., ed. 1, p. 159; Roxb. in Beatson's St Helena Tracts, p. 304; Melliss, St Hel., p. 304.
Ipomœa maritima, R. Br., Prodr., Fl. Nov. Holl., p. 486; Bot. Reg., t. 319.

St Helena.—Indigenous. Without special locality—*Roxburgh*; Sandy Bay—*Burchell*, 66[2].

"Sea-bean."

Almost everywhere on tropical and subtropical sea-shores, and also penetrating far inland in some countries. Melliss takes up the name *Convolvulus brasiliensis*, from Roxburgh, but he does not appear to have met with the plant, which is rather singular, because it is one of those plants which are not easily displaced when they once obtain a footing.

We have expressed an opinion in another part of this work that the seeds of *Ipomœa biloba*, or *pes-capræ* as it is more commonly called, are carried by the waves of the sea from one place to another, and often germinate when cast ashore; and we find this opinion supported by a memorandum in Burchell's manuscript. It runs thus: "*Statio: In littore, ventum versus, Sandy Bay, ubi sæpe inveniuntur semina Acaciæ scandentis et Dolichos. Semina super undas longe feruntur, ab aqua marina nullium detrimenti, et variis in littoribus hospitaliter recipientia: planta hæcce vere nautica.*"

The "*Acacia scandens*" mentioned by Burchell is more familiarly known under its modern appellation, *Entada scandens*. It is widely dispersed in tropical countries, and its seeds are surpassed by few in size. Among other places, they are frequently thrown up on the Azores, where, however, the conditions are not favourable to their germination, though they retain their vitality, as has been proved by plants having been reared in the hothouses at Kew from seeds picked up on the shores of the Azores. From the direction of the prevailing oceanic currents, it is evident that these seeds are carried from the West Indies to the Azores, a distance of about 3000 miles.

Burchell does not say whether the seeds of *Entada scandens* ever begin to germinate on the coast of St Helena; it is obvious, however, that this plant could not establish itself there. Melliss states that the seeds are often cast ashore on the windward side of the island, and that they have been known to germinate and grow into plants of considerable size; yet he doubted the existence of a single plant in the island at the time he wrote. He also mentions that the hard slate-coloured seeds of *Guilandina bonduc* are frequently washed ashore on the beach at Sandy Bay, the same locality given by Burchell, though no instance of their having germinated had come under his observation.

NYCTAGINEÆ.

Boerhaavia verticillata, Poir.

Boerhaavia verticillata, Poir. in Lam. Encycl., v. p. 56; DC., Prodr., xiii. 2, p. 454; Melliss, St Hel., p. 312.
Boerhaavia repanda, Roxb. in Beatson's St Helena Tracts, p. 302, non Willd.
Boerhaavia helenæ, Rœm. et Schult., Syst. Veg., i. Mant., p. 73.

St Helena.—Indigenous? Ladder Hill, and various other localities—*Burchell*, 1; Rupert's Hill, &c.—*Melliss*.

"Hogweed."

This plant is widely diffused in Tropical Africa, and Melliss thinks it is probably indigenous in St Helena; but it is more likely to be an introduced plant, because all the known indigenous plants have a peculiar facies. It would seem, however, to have been commoner in Roxburgh's time than it is now, for he says "common amongst the rocks in James's Valley, &c."

CHENOPODIACEÆ.

Suæda fruticosa, Forsk.

Suæda fruticosa, Forsk., Fl. Ægypt.-Arab., p. 70; DC., Prodr., xiii. 2, p. 156.
Salsola fruticosa, Linn., Sp. Pl., ed. 2, p. 324.
Salsola salsa, Roxb. in Beatson's St Helena Tracts, p. 322.
Schoberia salsa, Melliss, St Hel., p. 314.

St Helena.—Indigenous. In the driest and most sterile hills of the coast—*Burchell*, 89. There is also a specimen in Kew Herbarium from St Helena without the collector's name.

Common on the eastern coasts of the Atlantic, the Mediterranean, and the salt marshes of Western Asia.

This is the "Samphire Bush" of the islanders, which Roxburgh records as common over the most barren parts of the island; and Melliss states that it is very common all over the rocky parts near the sea-coast, and in some of the deeply cut ravines, especially in Fisher's Valley, large tracts are covered with it to the exclusion of everything else.

Chenopodium, spp.

Chenopodium, spp.

St Helena.—Introduced? In that part of Longwood nearest the sea, abundant—*Burchell*, 85 and 86.

These specimens are in such an advanced state that we are unable to identify them, but we suspect that they are introduced, and probably varieties of *Chenopodium murale*.

Both specimens are half-woody, and Burchell describes 85 as "*species viridis*," while of 86 he says:—"*Planta annua sesquipedalis, tota coccinea etiam radix interne.*"

Exomis axyrioides, Fenzl.

Exomis axyrioides, Fenzl. in Mog. Chenop. Enum., p. 49, et in DC. Prodr., xiii. 2, p. 89.

St Helena.—Indigenous? On the rocky ground about Lot's Wife, Castle Rock, &c.—*Gillespie; Melliss.*

A native of South Africa.

EUPHORBIACEÆ.

Acalypha rubra, Roxb. (Plate XLIX.)

Acalypha rubra, Roxb. in Beatson's St Helena Tracts, p. 295.
Acalypha reticulata, var. α *rubra*, Müll. Arg. in DC. Prodr., xv. 2, p. 851; Melliss, St Hel., p. 318, t. 52.

St Helena.—Endemic. From Plantation House, gathered by Mr Hardwicke—*Burchell*, 165; without locality—*Bennett; Walker;* given to me from the upland southward part of the island—*Hooker.*

There is also a specimen in Kew Herbarium from the collections of the late General Sabine, given by Mr R. H. Scott, F.R.S.

"Stringwood."

This elegant and graceful miniature tree is believed to be quite extinct now. Roxburgh states that it grew on the elevated parts of the south face of Diana's Peak; Burchell, in his manuscript notes, gives a locality in a woody hollow near the Round Tower; and Melliss has the following note:—"The last plant I saw of it in the island was one that had been transplanted to Oakbank about twenty years ago. It grew to a small tree about eighteen inches high, and blossomed and seeded freely, but is no longer there."

We cannot follow Müller in regarding it as a variety of the Mauritian *Acalypha reticulata;* and in all probability he would not have reduced it to that species had he seen as complete specimens as we have. He says:—"Primo intuitu ob folia ambitu latiuscula, late subrhombeo-ovata et ob partem basilarem nudam spicarum $1\frac{1}{2}$–2 cm., longam specifice diversa videtur, sed nullo charactere firmo distingui potest." In the first place, it is readily distinguished by its general appearance; then the very differently shaped leaves are thicker in texture, and have long red petioles and red veins; and the seed-vessel is quite destitute of the prickles so prominent on the upper back part of the carpels of the seed-vessel of *Acalypha reticulata.* The bracts, too, of the female flowers are much larger; and the pendent male spikes in well-developed specimens are eight or nine inches long. Roxburgh describes it in the following words:—"A beautiful small tree, a native of elevated parts of the south face of Diana's Peak, and called String-tree by the natives on account of its numerous beautiful red male spikes, which hang in great profusion from every twig. Ultimate branches tubercled with the scars of the fallen leaves; above, where the leaves remain, coloured and smooth, the petioles, nerves, and veins are also red and smooth."

Euphorbia chamæsyce, Linn.?

Euphorbia chamæsyce, Linn.? var. (vel species nova?)
Euphorbia rosea, Roxb. in Beatson's St Helena Tracts, p. 308; Melliss, St Hel., p. 319, non Retz.
Euphorbia prostrata, Burchell MSS. vix Ait.

St Helena.—Indigenous? In dry mountains near the sea—*Burchell*, 110; common on the barren rocky outskirts—*Melliss;* without locality—*Haughton; Whitehead.*

"French Grass."

We have been unable to match this, but in a genus like *Euphorbia* we shrink from founding a new species upon what may be only a slightly altered state of some well-known one, or even exactly the same as a described species. Roxburgh treated it as an introduced plant, and named it *Euphorbia rosea*, which it is not. Burchell, who did not distinguish between the native and introduced plants, collected it in Sandy Bay; Melliss expresses his opinion that it is probably indigenous.

MONOCOTYLEDONES.

LEMNACEÆ.

Lemna minor, Linn.

Lemna minor, Linn., Sp. Pl., ed. 1, p. 970; Hegelm., Monogr., p. 142, tt. 9 et 10.
"*Lemna polyrrhiza*, Linn.;" Melliss, St Hel., p. 330?

St Helena.—Introduced? Very common and abundant in the mountain streams, and covers every pond of water—*Melliss.*

The only specimens of a *Lemna* that we have seen from St Helena are *Lemna minor*, collected by Melliss himself, hence we suspect that these and the *Lemna polyrrhiza* of his enumeration are the same, though, of course, it is possible that both species occur. This very widely diffused aquatic was probably accidentally introduced into the island, though even in Burchell's time it was abundant, as we learn from his notes; yet he does not appear to have collected it. Roxburgh includes no *Lemna* in his catalogue, but as he visited the island after Burchell it can only be regarded as an omission. Hegelmaier, however, the monographer of the order, has no record of any member of the order occurring in this or any remote islet in any part of the world.

Water-plants sometimes spread very rapidly when introduced into a fresh region. Of this we have an example in this country in the American water-weed, *Elodea canadensis*. Yet we should not have expected that a *Lemna* would ascend the mountain streams. One species occurs in the Bermudas, whither it may have been carried by some water-bird.

JUNCACEÆ.

Juncus bufonius, Linn.

Juncus bufonius, Linn., Sp. Pl., ed. 1, p. 328; Kunth, Enum., iii. p. 353; Melliss, St Hel., p. 342.

St Helena.—Introduced? Upland places at 1000 feet altitude, apparently native—*Hooker*; in moist shady places—*Burchell*; very common on the high land—*Melliss.*

Common in nearly all temperate regions.

Juncus lomatophyllus, Spreng.

Juncus lomatophyllus, Spreng., Neue Entdeck, 1821, ii. p. 108; Buchenau, Monogr. Junc. Cap., p. 466.
Juncus capensis, Thunb., var. *latifolius*, E. Mey., Junc., p. 48, ex Kunth, Enum., iii. p. 342.

St Helena.—Indigenous? From the valley by Miss Mason's—*Burchell*, 97.

This very distinct species is common in South Africa, and was most likely introduced into the island; yet Burchell seems to have regarded it as indigenous. In his manuscript notes he gives the general habitat thus: "In rivulis regionis interioris"; and Melliss says it is very common along banks of streams throughout the island.

Juncus effusus, Linn.

Juncus effusus, Linn., Sp. Pl., ed. 1, p. 326; Melliss, St Hel., p. 342.

St Helena.—Introduced? Near Diana's Peak, at 2000 feet—*Melliss.*

This rush is neither mentioned, nor has it been collected in the island, as far as we are aware, by any other person.

CYPERACEÆ.

Several members of this order are in the earlier collections from St Helena, and were regarded as indigenous by Roxburgh, Burchell, and other travellers; but it is difficult to determine which of them really are native and which introduced, especially the species of *Cyperus* itself, as they are so easily introduced in ballast, &c.

Cyperus distans, Linn.

Cyperus distans, Linn., Suppl., p. 103; Jacq., Ic. Pl. Rar., ii. t. 299; Kunth, Enum., ii. p. 93; Benth., Fl. Austr., vii. p. 277.

St Helena.—Indigenous? In rivulets and wet places—*Burchell*, 4; moist places, ravines, &c.—*Melliss*, 132; without locality—*Cuming.*

Widely spread over the warmer regions of both hemispheres.

Cyperus umbellatus, Benth.

Cyperus umbellatus, Benth., Fl. Hongk., p. 386; Fl. Austr., vii. p. 289.
Mariscus umbellatus, Vahl, Enum., ii. p. 376; Kunth, Enum., ii. p. 118.]

St Helena.—Indigenous? In the higher pastures as well as in the dry places near the coast—*Burchell*, 5; very common generally—*Melliss.*

A common species in Tropical Asia and Africa, and occurring in North-east Australia. It is one of the few wild plants of Ascension.

Cyperus lævigatus, Linn.

Cyperus lævigatus, Linn., Mant., p. 179; Bœckl. in Linnæa, xxxv. p. 486; Benth., Fl. Austr., vii. p. 263; Rottb., Descr. et Ic. Pl., t. 16, fig. 1.
Cyperus mucronatus, Rottb., l. c., p. 19, t. 8, fig. 4; Kunth, Enum., ii. p. 17.

St Helena.—Indigenous? In watery places, Sisters' Walk, above Major Hodson's, plentifully—*Burchell*, 10; on the face of Horse Point, but rare—*Melliss*, 160.

Widely spread over the warmer regions of both hemispheres, especially in maritime districts.

Cyperus polystachyus, Rottb.

Cyperus polystachyus, Rottb., Descr. et Ic. Pl., p. 39, t. 11, fig. 1; Benth., Fl. Austr., vii. p. 261; Bœckl. in Linnæa, xxxv. p. 477; Kunth, Enum., ii. p. 13.

St Helena.—Indigenous? In the watercourse in Sisters' Walk, above Major Hodson's—*Burchell*, 8; near water streams in the ravines up the Central Ridge—*Melliss*; without locality—*Hooker*.

Common in the warmer regions of both hemispheres, and extending northwards to South China, the Mediterranean region, and the southern United States.

The form collected in St Helena by Sir Joseph Hooker is almost stemless, being only one to two inches high; and there are similar specimens in Kew Herbarium from Orissa, collected by Mr C. B. Clarke.

Cyperus difformis, Linn.

Cyperus difformis, Linn., Sp. Pl., ed. 2, p. 67; Kunth, Enum., ii. p. 38; Benth., Fl. Austr., vii. p. 268; Sibth., Fl. Græca, t. 46; Bœckl. in Linnæa, xxxv. p. 586.

St Helena.—Indigenous? Under the waterfall in Sandy Bay—*Burchell*, 6.

Very widely spread in tropical and subtropical regions in the Old World.

Burchell seems to be the only person who collected this species in St Helena.

Cyperus rotundus, Linn.

Cyperus rotundus, Linn., Syst. Veg., p. 98; Kunth, Enum., ii. p. 58; Benth., Fl. Austr., vii. p. 279; Bœckl. in Linnæa, xxxvi. p. 283.

Cyperus hexastachyus, Rottb., Descr. et Ic. Pl., t. 14, fig. 2.

St Helena.—Introduced, almost certainly. "Botanic Garden"—*Burchell*, 11; common about gardens—*Melliss*.

This is the *Cyperus herbivagus* (*errore herbicavus*), Kunth, or "Nut-grass" of Melliss's St Helena. Burchell calls it "Knot-grass," and adds "rarissime floret." It is one of the most widely dispersed species of the genus both in temperate and tropical regions.

Cyperus eragrostis, Vahl.

Cyperus eragrostis, Vahl, Enum., ii. p. 322; Kunth, Enum., ii. p. 7; Benth., Fl. Austr., vii. p. 258; Bœckl. in Linnæa, xxxv. p. 443.

St Helena.—Introduced? At Major Dentaaffe's, under the waterfall in Sandy Bay—*Burchell*, 7.

Very widely dispersed in the Old World.

Kyllinga monocephala, Rottb.

Kyllinga monocephala, Rottb., Descr. et Ic. Pl., p. 13, t. 4, fig. 4; Kunth, ii. p. 129; Benth., Fl. Austr., vii. p. 251; Bœckl. in Linnæa, xxx. p. 427.

St Helena.—Indigenous? In shady pastures—*Burchell*, 18; abundantly in damp fields, in ravines, streams of water, &c.—*Melliss*.

Roxburgh, in Beatson's St Helena Tracts, enumerates this name and "*Kyllinga sumatrensis*, Willd.," which is *Cyperus umbellatus*.

Common in Tropical Asia and Africa, and present in Eastern Australia, and probably, Mr Bentham states, identical with some of the American forms.

Fimbristylis (Oncostylis) neglecta, Hemsl. (Plate XVIII.)

Fimbristylis (*Oncostylis*) *neglecta*, Hemsl.

Pusilla, habitu *Isolepidis setaceis*, glumis brunneis carinatis utrinque longitudinaliter distincte 4–5 nervosis.

Herba annua (?) cæspitosa, 1–5 poll. alta. *Caules* filiformi, foliis sæpissime longiores. *Folia* gracillima, flaccida, concavo-convexa, acuta, marginibus leviter scabrida, basi anguste-vaginantia et pilis longis parcissime instructa. *Spiculæ* sæpissime solitariæ, interdum 2–3 aggregatæ, breviter 1-bracteatæ, vel ebracteatæ, 4-floræ; glumæ glabræ, brunneæ, nitidæ, carinatæ, utrinque longitudinaliter distincte 4–5-nervosæ, exteriores subaristatæ; stylus trifidus. *Nux* obtuse trigona, subturbinata, glabra, interdum marmorata, transverse recteque minute lineolata, stylis basi incrassata persistente coronata.

St Helena.—Endemic. On the dry rocks by the side of the side-path opposite High Knoll—*Burchell*, 15; rocky barren soil at an elevation of 1800 feet—*Melliss*.

Also in the herbarium of the British Museum, collected by Robertson in 1773.

Fimbristylis (Oncostylis) lichtensteiniana, Hemsl. (Plate XIX.)

Fimbristylis (*Oncostylis*) *lichtensteiniana*, Hemsl.
Scirpus lichtensteinianus, Bœckl. in Linnæa, xxxvi. p. 745.
Isolepis lichtensteiniana, Kunth, Enum., ii. p. 207.

St Helena.—Endemic. From the top of the Little Stone Top—*Burchell*, 16 and 17; dry rocks on Diana's Peak, at 2000 feet—*Hooker*; common among the rocks on the outer portion of the island—*Melliss*.

Scirpus setaceus, Linn.

Scirpus setaceus, Linn., Sp. Pl., ed. 1, p. 49; Benth., Fl. Austr., vii. p. 327; Reichb., Ic. Fl. Germ., t. 301.
Isolepis setacea, R. Br., Prodr. Fl. N. Holl., p. 222; Kunth, Enum., ii. p. 193; Hook. f., Fl. Tasm., ii. p. 88.
Isolepis prolifera, Melliss, St Hel., p. 344, vix R. Br.

St Helena.—Indigenous? In running water, Swanley Valley and wet places elsewhere—*Burchell*, 13 and 14; banks of streams at 2500 feet—*Hooker*, 275; damp places—*Melliss*.

Common in extra-tropical regions of the Old World, in both hemispheres.

This plant must have been abundant in the island in Burchell's time, for he states

that it was mixed with mud for plastering instead of hair. The common form in St Helena is the variety *savii*; but there is a proliferous condition (Burchell's 14) which we have referred to this species, and which is very common in the island, that may be an exceedingly slender state of *Scirpus proliferus* or some other species. Melliss states that it is very abundant, covering all the streams and moist parts of the island.

Scirpus nodosus, Rottb.

Scirpus nodosus, Rottb., Descr. et Ic. Pl., p. 52, t. 8, fig. 3; Benth., Fl. Austr., vii. p. 331; Bœckl. in Linnæa, xxxvi. p. 718.
Isolepis nodosa, R. Br., Prodr. Fl. N. Holl., p. 221; Kunth, Enum., ii. p. 199; Hook. f., Fl. Tasm., ii. p. 87; Rich., Voy. de l'Astrolabe, t. 18.
Fimbristylis textilis, Roxb. in Beatson's St Helena Tracts, p. 309; Melliss, St Hel., p. 343.
Isolepis holoschœnus, Melliss, St Hel., p. 343, non Rœmer et Schultes.

St Helena.—Indigenous. In dry pastures and other places—*Burchell*; without special localities—*Masson* and *Robertson*, in Brit. Mus.

Australia, New Zealand, St Paul Island, South Africa, and extra-tropical South America.

From Roxburgh's description and other evidence there can be no doubt that his *Fimbristylis textilis* is *Scirpus nodosus*. Although one of the commoner plants in the island, few travellers have collected specimens, and in Kew Herbarium there is only one sheet, collected by Burchell. It is, or was, extensively used for thatching. Roxburgh states that it grew in the interior of the island in plenty for every purpose, and was from three to six feet high. Burchell gives the height as two to three feet. According to Melliss, it still grows abundantly on the semibarren outskirts of the island, at altitudes of 100 to 1500 feet, and at Peak Hill, Man and Horse, and Horse Pasture.

Carex æquabilis, Boott.

Carex æquabilis, Boott, Carices, i. p. 66, t. 178.
Carex longifolia, Burchell MS. in herb. D. Turner, nunc herb. Kew, non alior.

St Helena.—Endemic. On and under High Peak—*Burchell*, 20.

Carex prælta, Boott.

Carex prælta, Boott, Carices, i. p. 66, tt. 179 et 180; Melliss, St Hel., p. 342, t. 53.
Carex pedunculata, Willd. [Muhlenb.] ex Roxb. in Beatson's St Helena Tracts, p. 302, sed omnino differt.
Carex elata, Burchell MS. in herb. D. Turner (nunc herb. Kew.)

St Helena.—Endemic. Diana's Peak—*Burchell*, 19; on the summit of Diana's Peak—*Hooker*; along the Central Ridge from Diana's Peak to High Peak, at altitudes of 2500 to 2700 feet—*Melliss*.

There seems to be only one species of *Carex* in the island; but among many good specimens the only one bearing quite ripe nuts is the type specimen of Boott's *Carex*

æquabilis, which we should rank at the highest as a variety of the same species as *Carex prælta*. Burchell distinguished them as follows:—"*Carex elata*—Culmi graciles, 4–6 pedales, spiculis quibusdam fœmineis ad apices masculis; monœcia, superiores mere masculi; inferiores feminei. *Carex longifolia*—Culmi foliis breviores, spicis masculis ad apices fœmineis; monœcia, inferiores mere fœminei."

GRAMINEÆ.

Of this order the indigenous element in St Helena seems to have been exceedingly small, consisting probably of only three or four species described below; but many widely spread grasses were common there at the beginning of the present century, and are now found all over the island. Some of these doubtless were purposely introduced, others accidentally, while a few may have reached the island quite independently of human agency. Among the commoner species are:—*Paspalum scrobiculatum*, Linn.; *Panicum colonum*, Linn.; *Panicum crus-galli*, Linn.; *Panicum sanguinale*, Linn.; *Eriochloa annulata*, Kunth; *Setaria verticillata* and *Setaria glauca*, Beauv.; *Gymnothrix caudata*, Schrad.; *Coix lachryma*, Linn.; *Phalaris canariensis*, Linn.; *Stenotaphrum americanum*, Schrank; *Anthoxanthum odoratum*, Linn.; *Polypogon littoralis*, Sm.; *Polypogon monspeliensis*, Desf.; *Cynodon dactylon*,[1] Pers.; *Dactyloctenium ægyptiacum*, Willd.; *Eleusine indica*, Gærtn.; *Eragrostis poæoides*, Beauv.; *Triodia decumbens*, Beauv.; *Poa annua*, Linn.; *Festuca myurus*, Linn.; *Festuca bromoides*, Sm.; *Bromus vestitus*, Schrad., &c. Almost every one of the foregoing grasses is now very widely spread, and in many cases it is impossible to determine where they are really indigenous.

Alopecurus paniculatus, Roxb., in Beatson's St Helena Tracts, p. 296, without a description, remains undetermined.

Ehrharta urvilleana, Kunth, Enum., i. p. 14; Duperr., Voy. "Coquille," Bot. Phaner., p. 147, t. 24, published as indigenous in St Helena, is the same as *Ehrharta longiflora*, Sm., a South African species, and must be regarded as an introduced plant.

Eleusine calycina, Roxb., l. c., p. 308, without description, is unknown to us.

"*Agrostis purpurascens*, Willd.," Roxb. in Beatson's St Helena Tracts, p. 296, is clearly *Sporobolus indicus*, R. Br. (including *Sporobolus elongatus*, R. Br.), and not an *Agrostis*, for Roxburgh's imperfect description exactly agrees, as far as it goes, with the characters of the *Sporobolus*. This grass is one of the more widely dispersed kinds, being extremely common all over Tropical and Subtropical Asia, Africa, America, and Australia, and

[1] According to Melliss, this is perhaps the most abundant grass in the island, "and doubtless indigenous," thus contradicting what he himself says (and we have reproduced elsewhere) in his introduction to the botanical part of his work. It is now almost ubiquitous in warm countries, and we regard it as an introduced plant in St Helena. Roxburgh (under *Panicum dactylon*, Linn.) says "Wire-grass" is the vernacular name, and it is supposed to be a native of the island; yet he leaves the question open.

extending to many of the islands, including New Zealand, and to some of the remote islets, including the Bermudas. Another species of the same genus, *Sporobolus virginicus*, Kunth, is almost universally spread in maritime districts, in tropical and subtropical regions, and was one of the few plants found in South Trinidad by Sir Joseph Hooker. The grain of these grasses is exceedingly small, that of *Sporobolus indicus* being about $\frac{1}{24}$th of an inch long and $\frac{1}{60}$th of an inch broad, hence the means by which they may be conveyed from place to place are almost infinite. Roxburgh regarded his "*Agrostis purpurascens*" as indigenous; Burchell's n. 40, which we take to be the same plant, was collected "by the road near Miss Mason's and in the road near Forster's;" but Burchell says nothing as to its being native or otherwise. Melliss sent a specimen of the same grass to Kew in 1863, labelled "St Helena," but not localised. It may be worth while reproducing Roxburgh's descriptive note in support of our identification:—"Indigenous on the hills of St Helena, where it grows to be from two to three feet high; perfectly erect, very naked of leaves, as they are only few in number, but short and very slender. The inflorescence is a long slender panicle composed of numerous small, simple, or compound appressed branches, crowded with numerous short-pedicelled, smooth flowers. Calycine valves unequal, scarce half the length of the corolla, which has its two valves nearly equal and rather acute; but nothing like an awn either here or to the calyx."

Agrostis simulans, Hemsl.

Agrostis simulans, Hemsl., n. sp.

In aspect and structural character this is so near the European *Agrostis alba*, var. *stolonifera*, as to require close examination in order to find any tangible differences. The late General Munro had marked it as a "good species," and after a careful comparison we have adopted his view. Yet it is not easy to draw up a description that would exclude every other species. Perhaps it will be better to indicate the differences rather than merely describe the plant. Of the same habit of growth as *Agrostis stolonifera*, *Agrostis simulans* has more slender culms and smaller leaves, with scarcely any trace of a ligule in the place of the prominent one of the former species. The branches of the panicle are fewer and relatively longer, and ultimately become nearly horizontal; and the pale is smaller in comparison than in *Agrostis stolonifera*.—Hook., Ic. Pl., t. 1455.

There are copious specimens collected by various travellers, and they all exhibit the differences indicated.

St Helena.—Endemic. Sandy Bay—*Burchell*, 36; Diana's Peak, above 2000 feet—*Hooker*, 269; without locality—*Melliss*, in 1863.

In his manuscript notes Burchell states that this grass was abundant in pastures in the interior of the island.

Eragrostis saxatilis, Hemsl. (Plate L.)

Eragrostis saxatilis, Hemsl., n. sp.

Species distinctissima facie *Festucæ* species quædam foliis gracillimis paniculis subsimplicibus, spiculis laxis glumis rigidis acuminatis.

Perennia fere undique glaberrima, dense cæspitosa, rhizomate crassiuscula. *Culmi* erecti, filiformes, 9–15 poll. alti, folia æquantes vel breviores. *Folia* dura, anguste vaginantia, arctissime (saltem in siccis) involuta, setacea, margine minute serrulata, apice acutissima, in loco ligulæ longiuscule albo-barbata. *Paniculæ* strictæ, 4–6 poll. longæ, ramulis sæpius 1–3 spiculatis, inferioribus longioribus (1–2 poll.) plurispiculatis; spiculæ laxæ, sæpissime 5–6 floræ, 2–4 lineas longæ, graciliter breviterque pedicellatæ, pedicellis aliis spiculis brevioribus vel æqualibus aliis longioribus. *Flores* distichi, dissitiusculi, hermaphroditi, vel supremus imperfectus; glumæ duriusculæ, longe acuminatæ, prominenter carinatæ, 2-exteriores vacuæ paulo breviores, anguste lanceolatæ, 1-nerviæ, florentes 3-nerviæ, ovato-lanceolatæ; palea paulo brevior valide 2-carinata, introflexa, apice truncata, carinis minute serrulatis; stamina 3; ovarium glabrum; styli distincti, stigmatibus longiuscule plumosis. *Caryopsis* libera, cylindrica, glabra.

St Helena.—Endemic. From off Lot—*Burchell*, 50½; among dry rocks, by Major Dentaaffe's, in Sandy Bay—*Burchell*, 50; growing in tufts on the rocky, barren hills near Lot's Wife on the south-west side of the island, at elevations of 1500 to 2000 feet—*Melliss*.

A very distinct grass, growing in dense tufts, the rhizome eventually attaining a considerable size. The inflorescence and narrow rather hard glumes remind one of some of the forms of *Festuca ovina* rather than the genus *Eragrostis*, but the structure is that of the latter genus. Burchell's general indication of the habitat is, "In locis saxosis præruptis siccissimis."

Aristida racemosa, Sprengel.

Aristida racemosa, Sprengel, Mantissa Prima, p. 35; Kunth, Enum. Pl., i. p. 197.
Chætaria racemosa, Rœm. et Schult., Syst. Veg., ii. p. 396.

"Ex insula St Helenæ."

We have failed to identify this.

Demazeria oblitera, Hemsl. (Plate LI. figs. 1–8).

Demazeria oblitera, Hemsl., n. sp.

Cæspitosa, glaberrima, culmis gracilibus adscendentibus, gluma florifera tantum margine ciliata.

Annua? radix fibrosa, fibrillis gracillimis duris 4–5 poll. longis. *Culmi* 2–9 poll. longi, læves, demum nitidi, 4–6 nodi, geniculati. *Folia* fasciculorum radicalium brevissima,

lævia, striata, arcte involuta, obtusiuscula, dura, 3–6 lineas longa, caulina usque ad 1½ poll. longa, ligula brevissima pauci-ciliata. *Paniculæ* terminales, solitariæ, spiciformes, subsessiles, 6–15 lineas longæ, spiculis breviter pedicellatis 3–4 floris imbricatis. *Flores* hermaphroditi vel supremus imperfectus; glumæ demum subcoriaceæ, acutæ vel florentes breviter acuminatæ nec aristatæ; 2-exteriores vacuæ, prominenter 5-costatæ; carina leviter scabrida; florens vix brevior, obscure pluri-nervia, carina nuda, margine infra medium longe ciliata; palea oblonga minute ciliolata. *Caryopsis* omnino libera, oblonga, nitida.

St Helena.—Endemic. Growing in barren places near, and south-east from the Gut in Deadwood—*Burchell*, 59.

We have only seen one plant of this grass, which we have ventured to describe as new, because we have not been able to identify it with any known species of the genus, though it is closely allied to *Demazeria acutiflora* (*Brizopyrum acutiflorum*, Nees). The latter is a native of South Africa, and apparently very rare, for we have only seen specimens collected by Drège in Piquetberg, on the west coast, about one hundred miles north of Cape Town. It differs from our plant in its erect habit in having usually several inflorescences on the same culm, in its very much more acuminate glumes, of which the outer want the prominent ribs. Further, the almost aristate flowering glume is copiously bearded on the keel as well as on the margins (Pl. LI. figs. 9–12). It is possible that the St Helena plant may be a stray introduction from the Cape of a species which is rare and local there. At the same time it was collected in a remote part of the island, where one would little expect to find a solitary introduced plant.

CRYPTOGAMÆ.—VASCULARES.

LYCOPODIACEÆ.

Lycopodium saururus, Lam.

Lycopodium saururus, Lam., Encycl. Bot., iii. p. 653; Swartz, Synop. Fil., p. 176; Spring, Monogr. Lycopod., partie 1, p. 21, et partie 2, p. 6; Baker, MSS. in Herb. Kew.
Lycopodium insulare, Carmich. in Trans. Linn. Soc. Lond., xii. p. 509.
Lycopodium axillare, Roxb. in Beatson's St Helena Tracts, p. 312.
Lycopodium taxifolium, Melliss, St Hel., p. 357, non Swartz.
Lycopodium taxifolium, Spring, Monogr. Lycopod., partie 1, p. 31, *pro parte*.
Lycopodium selago, Spring, Monogr. Lycopod., partie 2, p. 5, *pro parte*.

St Helena.—Indigenous. Among grass on the summit of Diana's Peak—*Burchell*, 197; *Melliss*; open steep marshy ground, bordered with wood, 200 feet below the top of Diana's Peak, on the east side, rare—*Hooker*; without locality—*Lefroy*; *Lyall*; *Morris*, in 1883.

Widely spread in Africa and South America, and in islets of the Atlantic and Southern Oceans.

Lycopodium cernuum, Linn.

Lycopodium cernuum, Linn., Sp. Pl., ed 2, p. 1566; Swartz, Synop. Fil., p. 178; Bory in Duperr. Voy. "Coquille," Bot. Crypt, p. 246; Spring, Monogr. Lycopod., partie 1, p. 79, partie 2, p. 37; Roxb. in Beatson's St Helena Tracts, p. 311; Pritchard, Cat. St Hel. Pl., p. 19; Kuhn, Fil. Afr., p. 183.

St Helena.—Indigenous. On the top of Diana's Peak—*Burchell*, 198; *Hooker*; without locality—*Seemann*; *Morris*, in 1883.

"Plentiful on grassy banks on the high Central Ridge, near Diana's Peak, at 2000 to 2700 feet."—*Melliss.*

Common and generally diffused in the tropics, and extending into the south temperate regions to New Zealand; it also occurs in some of the other remote islets, as Ascension and St Paul.

FILICES.

POLYPODIACEÆ.

Dicksonia arborescens, L'Herit.

Dicksonia arborescens, L'Herit., Sert. Angl., p. 31; Hook., Sp. Fil., i. p. 66, t. 22, A.; Hook. and Bak., Synop. Fil. p. 50; Roxb. in Beatson's St Helena Tracts, p. 306; Kuhn, Fil. Afr., p. 160; Melliss, St Hel., p. 553, t. 54.
Balantium arborescens, Hook., Gen. Fil., t. 20.
Balantium auriconum, Kaulf., Enum. Fil., p. 228, t. 21, fig. 12.
Dicksonia integra, Swartz, Synop. Fil., p. 136.

St Helena.—Endemic. Diana's Peak and High Peak—*Burchell*, 193, 194; *Hooker*; *Cuming*; *Seemann*; and many other travellers, including *Morris*, in 1883.

The only tree-fern of the island. It grows on the Central Ridge at Diana's and High Peaks at an altitude of 2400 feet up to the summits. Burchell describes the trunk as from twelve to twenty feet high; and Roxburgh says "general height, when full grown, twenty or more feet, and of various thicknesses up to that of a man's body, with fronds from four to ten feet long." In 1840, Sir Joseph Hooker found very few stems above three feet high, and the tallest was only eleven feet, while most of the plants were very stunted, the stems scarcely appearing above the surrounding herbage. Melliss gives the dimensions as four to ten feet, with a diameter of six to eight inches.

Hymenophyllum capillaceum, Roxb.

Hymenophyllum capillaceum, Roxb. in Beatson's St Helena Tracts, p. 311; Hook., Sp. Fil., i. p. 109, t. 38, B.; Hook. and Bak., Synop. Fil., p. 58; Melliss, St. Hel., p. 354; Kuhn, Fil. Afr., p. 38.
Hymenophyllum infortunatum, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 284, t. 38, fig, 3; Hook. f., Fl. Antarctica, p. 104.
Hymenophyllum capillare, Pritchard, Cat. St. Hel. Pl., p. 18.
Sphærocionium infortunatum, Presl, Hymen., p. 35.

St Helena.—Endemic. On the trunks of the tree-fern and other trees, on the summit

of Diana's Peak—*Roxburgh; Burchell*, 195; *Hooker; Seemann; Mellis* and others; *Morris*, in 1883.

Cheilanthes multifida, Swartz.

Cheilanthes multifida, Swartz, Synop. Fil., pp. 129 et 334; Hook., Sp. Fil., ii. p. 90, t. 100, B.; Hook. and Bak., Synop. Fil., p. 138; Melliss, St. Hel., p. 353; Hook., Gard. Ferns, t. 39; Kuhn, Fil. Afr., p. 73.
Cheilanthes tenuifolia, Roxb. in Beatson's St Helena Tracts, p. 303?
Cheilanthes capensis, Eckl. in Un. It., n. 168.
Adiantum globatum, Poir., Suppl., i. p. 144.

St Helena.—Indigenous. On the rocks in Breakneck Valley—*Burchell*, 192; without locality—*Bennett;* amongst rocks and stones on the somewhat barren and exposed parts of the island at High Knoll, High Hill, Red Hill, Thompson's Hill, the Friar Rock, Sandy Bay, &c.—*Melliss; Morris*, in 1883.

Common in South Africa, and also found in Java.

Pteris flabellata, Thunb.

Pteris flabellata, Thunb., Prodr. Fl. Cap., p. 733; Swartz, Synop. Fil., p. 99; Hook., Sp. Fil., ii. p. 185; Hook. and Bak., Synop. Fil., p. 161; Melliss, St Hel., p. 356.
Pteris arguta, Ait., var. *flabellata*, *α major*, Mett. ex Kuhn, Fil. Afr., p. 76.
Pteris elegans, Jacq., Fragm., p. 74, t. 116.
Pteris arguta, Schl., Adumb. Fil. Prom. Bon. Spei, p. 43; Kunze in Linnæa, vi. p. 186.
Pteris semiserrata, Roxb. in Beatson's St Helena Tracts, p. 319.

St Helena.—Indigenous. Swanley Valley—*Burchell*, 189; steep grassy banks on the southern declivity of Diana's Peak, below the trees—*Hooker;* without locality—*Seemann, Cuming*, and *Haughton; Morris*, in 1883.

A common African fern, ranging from Abyssinia and Fernando Po to the Cape of Good Hope; also in Bourbon and Rodriguez. A variety occurs in Ascension.

This, according to Melliss, is the most common roadside fern in the island, and it is also abundant in the ravines on the upper lands, mostly between 1500 and 2000 feet, where it selects a rocky soil. It is very plentiful about such places as Joho's Hole, and even occurs on the summit of Lot and on the eastern side of High Knoll.

Pteris paleacea, Roxb. (Plate XX.)

Pteris paleacea, Roxb. in Beatson's St Helena Tracts, p. 319; Hook., Sp. Fil., ii. p. 186, t. 133, A.; Hook. and Bak., Synop. Fil., ed. 2, p. 159; Melliss, St Hel., p. 356.

St Helena.—Endemic. *Burchell; Nuttall; Cuming; Hooker; Seemann; Haughton; Melliss; Morris*, in 1883.

"A less abundant species than *Pteris flabellata*, found at a higher altitude (at about 2500 feet), where its remarkable fan-like fronds mingle with *Dicksonia* and *Asplenium* on the mountain spurs, and in the ravines north and south of the Central Ridge, near

High and Diana's Peaks."—*Melliss.* "Ravines north and south of the Central Ridge."—*Morris.*

Asplenium platybasis, Kunze. (Plate XXI.)

Asplenium platybasis, Kunze ex Mett., Aspl., n. 154; Hook. and Bak., Synop. Fil., p. 206; Melliss, St Hel., p. 352.
Asplenium firmum, Fée, Gen. Fil., p. 197; Kuhn, Fil. Afr., p. 102.
Asplenium falcatum, Roxb. in Beatson's St Helena Tracts, p. 299.
Asplenium falcatum, Lam., and *firmum*, Moore, Ind. Fil., p. 129; Hook., Sp. Fil., iii. p. 160.

St Helena.—Endemic. Diana's Peak and Sandy Bay Ridge—*Burchell*, 183; rocks on Diana's Peak, rare—*Hooker*; without locality—*Seemann*; *Cuming*; *Lyall*; *Lady Dalhousie*, and others, including *Morris*, in 1883.

This is scarcely different from the widely spread *Asplenium falcatum*, Lam.

Asplenium furcatum, Thunb.

Asplenium furcatum, Thunb., Prodr. Fl. Cap., p. 735; Hook., Sp. Fil., iii. p. 165; Hook. and Bak., Synop. Fil., p. 214; Schk., Fil., p. 73, t. 79; Melliss, St Hel., p. 352.
Asplenium præmorsum, Swartz, Fl. Ind. Occ., iii. p. 1620, et Synop. Fil., p. 83; Roxb. in Beatson's St Helena Tracts, p. 299.

St Helena.—Indigenous. Sandy Bay—*Burchell*, 182; among loose stones in the descent into Sandy Bay, near Lot—*Hooker*; without locality—*Lefroy*; *Haughton*; and *Morris*, in 1883.

Melliss records it as growing in rocky crevices and on old walls, at 1500 to 1900 feet, near St Paul's Church, Terrace Knoll, &c.

Very widely dispersed in the tropics, and extending southward in Africa to the Cape of Good Hope.

Asplenium lanceolatum, Huds.

Asplenium lanceolatum, Huds., Fl. Angl., ed. 2, p. 454; Engl., Bot., t. 240; Hook., Sp. Fil., iii. p. 190; Hook. and Bak., Synop. Fil., p. 217; Kuhn, Fil. Afr., p. 104.

St Helena.—Indigenous? Without locality—*Hooker*.

South-west Europe; North Africa; Azores; Madeira; Canaries.

There is some doubt whether this fern was collected in St Helena, for the specimen is without an original label, and no other traveller has collected it in the island so far as we are aware. Melliss omits all mention of it.

[*Asplenium marinum*, Linn., is recorded by Moore (Ind. Fil., ii. p. 114) as occurring in St Helena and the Bermudas, but we have seen no specimens of it from either place, and the record was most likely based upon a mistake.]

Asplenium compressum, Swartz.

Asplenium compressum, Swartz in Schrad. Journ., 1800, ii. p. 52, et Synop. Fil., pp. 79 et 270; Hook., Sp. Fil., iii. p. 121; Hook., Fil. Exot., t. 76; Hook. and Bak., Synop. Fil., p. 206; Melliss, St Hel., p. 352; Luerssen in Abhandl. Naturw. Ver. Bremen., vii. p. 278; Kuhn, Fil. Afr., p. 99; Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 270.
Asplenium fœcundum, Kunze in Linnæa, xx. pp. 234 et 305.
Darea fœcunda, Fée, Gen. Fil., p. 333.

St Helena.—Indigenous. Without locality—*Burchell*, 184; wet places on rocks in the shaded woods of Diana's Peak—*Hooker*; also collected by *Haughton*, *Cuming*, *Lady Dalhousie*, and *Morris*, in 1883.

"Abundant amongst the native vegetation on the high Central Ridge, growing in the wettest parts, at an altitude of 2000 feet and upwards."—*Melliss*.

Also found in South Trinidad, according to Luerssen, in the place cited above, where he states that there is not the slightest doubt of the correctness of his identification. Through inadvertence Melliss copied under this species the distribution of some other, extending to South Africa, Bourbon, Madagascar, and Mauritius.

Asplenium erectum, Bory.

Asplenium erectum, Bory in Willd. Sp. Pl., v. p. 328; Kuhn, Fil. Afr., p. 102; Hook., Sp. Fil., iii. p. 126, t. 178; Melliss, St. Hel., p. 352; Hook., Fil. Exot., t. 72 (var. *proliferum*).
Asplenium lunulatum, Swartz, Synop. Fil., p. 80; Hook. and Bak., Synop. Fil., p. 202; Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 270.
Asplenium radicans, Pritchard, Cat. Pl. St Hel., p. 6, fide Hooker.
Asplenium reclinatum, Houlst. and Moore in Gard. Mag. Bot., ii. p. 260.
Asplenium tenellum, Roxb. in Beatson's St Helena Tracts, p. 299; Kuhn, Fil. Afr., p. 117.

St Helena.—Indigenous. Moist shady places on Diana's Peak, at 2000 feet—*Hooker*; near Carson's Gate—*Burchell*, 181; also collected by *Haughton*, *Cuming*, *Lefroy*, and others, as well as by *Morris*, in 1883.

Generally spread and common in the tropics, and extending into some extra-tropical regions. It is one of the few indigenous plants of Ascension, and it also occurs in Tristan da Cunha.

Kuhn (Fil. Afr., p. 105) enumerates *Asplenium lunulatum*, Swartz, as distinct from *Asplenium erectum*, Bory (l. c., p. 102), and he records both from St Helena, the former in the collection of Durville. He also retains specific rank for Roxburgh's *Asplenium tenellum*, citing Cuming, Melliss, and others as collectors of it.

Asplenium (Diplazium) nigro-paleaceum, A. Braun. (Plate XXII.)

Asplenium (Diplazium) nigro-paleaceum, A. Braun in Ind. Sem. Hort. Berol., 1861, App., p. 2; Baker in Hook. and Bak. Synop. Fil., p. 240.
Asplenium (Diplazium) arborescens, Mett. in Hook. Sp. Fil., iii. p. 256, *pro parte*; et Fil. Hort. Lips., p. 78.
Diplazium nigro-paleaceum, Kunze in Linnæa, xxiv. p. 270; Melliss, St Hel., p. 354, excl. synon.
Diplazium arborescens, J. Sm., Cat. Fil. Hort. Kew.

St Helena.—Endemic. Diana's Peak and Sandy Bay Ridge, and on woody hills in many places—*Burchell*, 186; dark woods, Diana's Peak—*Hooker;* without locality—*Walker, Haughton, Seemann;* common on roadsides in the higher lands—*Morris*, in 1883.

Melliss states that this grew somewhat plentifully on both sides of the Central Ridge, and was rarely found below an elevation of 1400 feet.

It was formerly regarded as a form of *Asplenium arborescens*, Mett., a species inhabiting Mauritius, Bourbon, Madagascar, and Johanna Island.

Nephrodium (Lastrea) patens, Desv.

Nephrodium (Lastrea) patens, Desv. in Mém. Soc. Linn. Par., vi. p. 258; Hook., Sp. Fil., iv. p. 95; Hook. and Bak., Synop. Fil., p. 262; Melliss, St Hel., p. 355.
Aspidium patens, Swartz, Synop. Fil., p. 49; Raddi, Fil. Bras., p. 32, t. 48.

St Helena.—Indigenous. In Swanley Valley, above and below the Willow Pond—*Burchell*, 175; without locality—*Lefroy, Cuming*, and *Morris*, in 1883.

Melliss says that this grows at a lower altitude than the other species of the genus, ranging from 1000 to 2500 feet, and was found on the sides of mountain streams in the neighbourhood of Oakbank, Powel's Spring, Willow Cottage, &c.

A common species in America from Florida and Texas to Chili and South Brazil; also in Tropical Africa and Polynesia.

Nephrodium (Lastrea) molle, Desv.

Nephrodium (Lastrea) molle, Desv. in Mém. Soc. Linn., vi. p. 258; Hook., Sp. Fil., iv. p. 67, *pro parte;* Hook. and Bak., Synop., p. 293.

St Helena.—Indigenous. *Morris*, in 1883.

This fern is found in nearly all tropical and subtropical regions throughout the world. As it was not collected in the island by any previous traveller, it is probably of recent introduction.

Nephrodium (Lastrea) cognatum, Hook.

Nephrodium (Lastrea) cognatum, Hook., Sp. Fil., iv. p. 123, t. 256; Hook. and Bak., Synop. Fil., p. 279; Melliss, St Hel., p. 355.
Lastrea cognata, Presl., Epim. Bot., p. 40.
Aspidium cognatum, Mett., Monogr. Aspid., p. 61; Kuhn, Fil. Afr., p. 128.

St Helena.—Endemic. Halley's Mount and Diana's Peak—*Burchell*, 176; Diana's Peak—*Hooker;* without locality—*Cuming; Seemann; Lyall;* and *Morris*, in 1883.

"One of the ferns of the highest land on the Central Ridge and Diana's Peak, at 2400 feet."—*Melliss.*

Kuhn cites "Ins Ascensionis (Hb. Miquel)," but we think this may be a mistake, because it is not in any of our numerous English collections from the island.

Nephrodium (Lastrea) napoleonis, Bory.

Nephrodium (Lastrea) napoleonis, Bory in Belang, Voy. Ind. Or. Bot., p. 61, t. 6, ex Hook., Sp. Fil., iv. p. 123, t. 255; Hook. and Bak., Synop. Fil., p. 279; Melliss, St Hel., p. 355.
Aspidium napoleonis, Fée, Gen. Fil., p. 292; Mett., Monogr. Aspid., p. 61.
Lastrea napoleonis, Presl., Epimel. Bot., p. 40.
Aspidium petersenii, Kunze ex Kuhn, Fil. Afr., p. 137.
Aspidium riparium, Roxb. in Beatson's St Helena Tracts, p. 298.

St Helena.—Endemic. Thompson's Wood Hill, the perpendicular woody rocks of Sandy Bay, and the bank at French's Gut—*Burchell*, 172, 173, 174; common on rocks in the woods of Diana's Peak—*Hooker;* on rocks near a spring close to Buonaparte's tomb—*Wallich;* without locality—*Bennett; Cuming; Harvey;* and *Seemann;* also, on Kuhn's authority, *Petersen; Perrottet;* and *Andersson.*

On the authority of Melliss, this abounded in 1875 on the banks of Napoleon's Cabbage-tree Road, and on the road to Newfoundland, at 2500 feet; but it is the only one of the endemic ferns not collected by Morris in 1883.

[Aspidium serratum, Kuhn.

Aspidium serratum, Kuhn, Fil. Afr., p. 142.

Amblya serrata (Fée, Mém. Soc. Sc. Nat. Strasb., xvi. p. 35, t. 40), "St Helena," is unknown to us.

Roxburgh includes *Aspidium coriaceum*, which is the same as *Aspidium capense*, in his list. We have seen no specimens from St Helena, and suspect that, as he also collected in South Africa, where this fern is common, he may have got his specimens confused. At the same time, it is not a fern unlikely to be found in the island. See its distribution in the enumeration of the plants in the Tristan da Cunha group.]

Polypodium marginellum, Swartz.

Polypodium marginellum, Swartz, Fl. Ind. Occ., iii. p. 1631; Hook., Sp. Fil., iv. p. 164; Hook. and Bak., Synop. Fil., p. 321; Kuhn, Fil. Afr., p. 149; Melliss, St Hel., p. 355.
Grammitis marginella, Swartz, Synop. Fil., p. 22; Roxb. in Beatson's St Helena Tracts, p. 310.
Grammitis linearis, Bory in Dupern. Voy. "Coquille" Bot. Crypt., p. 257.

St Helena.—Indigenous. On the trunk of the shining-leaved cabbage-tree, under West Lodge Telegraph—*Burchell*, 185; Diana's Peak—*Hooker;* without locality—*Nuttall; Shuter;* and *Haughton;* also *Morris*, in 1883.

Widely dispersed in Tropical America, and occurring in the Cape Verde Islands and Samoa.

Polypodium lanceolatum, Linn.

Polypodium lanceolatum, Linn., Sp. Pl., ed. 1, p. 1082; Swartz, Synop. Fil., p. 26; Hook. and Bak., Synop. Fil., p. 356; Kuhn, Fil. Afr., p. 147; Melliss, St. Hel., p. 356.
Pleopeltis ensifolia, Carmich. in Hook., Exot. Fl., i. t. 62.
Polypodium lepidotum, Willd. in Schl. Adumb., p. 17, t. 8; Hook., Sp. Fil., v. p. 56.
Polypodium macrocarpum, Willd., Sp. Pl., v. p. 147; Roxb. in Beatson's St Helena Tracts, p. 148.
Pleopeltis helenæ, Presl., Tent. Pterid., p. 193.

St Helena.—From the stem of a tree on Diana's Peak—*Burchell*, 170; climbing on rocks and trunks of trees—*Hooker*; also collected by *Cuming*; *Haughton*; and *Seemann*; and by *Morris*, in 1883.

A common and widely diffused species in warm countries, in America, as well as in the Old World. By an oversight it is recorded from Tristan da Cunha, Carmichael, in the "Species Filicum." *Pleopeltis ensifolia*, Carmich., was founded upon a specimen collected by Carmichael at the Cape of Good Hope; hence, probably, the error.

Polypodium molle, Roxb.

Polypodium molle, Roxb. in Beatson's St Helena Tracts, p. 318; Hook. and Bak., Synop. Fil., p. 308.
Phegopteris mollis, Kuhn, Fil. Afr., p. 123.
Phegopteris deltoidea, Mett. ex Kuhn, l. c.
Polypodium (Phegopteris) dianæ, Hook., Sp. Fil., iv. p. 234; Melliss, St Hel., p. 355, t. 55.

St Helena.—Endemic. Harding's Spring and Swanley Valley—*Burchell*, 171; dense woods east flank of Diana's Peak—*Hooker*; without locality—*Cuming*; *Haughton*; and *Morris*, in 1883.

"A very common roadside fern along Sandy Bay Ridge, and the high land at 2000 to 2500 feet; found both on the north and south sides of the Central Ridge."—*Melliss.*

Polypodium (Phegopteris) rugulosum, Labill.

Polypodium (Phegopteris) rugulosum, Labill., Fl. Nov. Holl., ii. p. 92, t. 241; Hook., Sp. Fil., iv. p. 272; Melliss, St Hel., p. 356; Roxb. in Beatson's St Helena Tracts, p. 318.
Polypodium (Phegopteris) punctatum, Thunb., β *rugulosum*, Hook. and Bak., Synop. Fil., p. 312.
Polypodium viscidum, Roxb. in Beatson's St Helena Tracts, p. 319.
Polypodium dicksonifolium, Roxb., l. c., p. 318?
Hypolepis helenensis, Fée, Gen. Fil., p. 147.
Phegopteris helenensis, Kuhn, Fil. Afr., p. 122.
Gymnogramme helenensis, Fée, Mém., viii. p. 79.

St Helena.—Indigenous. Swanley Valley, near the Willow Pond, *Burchell*, 191; without locality—*Hooker*; *Cuming*; *Nuttall*; *Lefroy*; and *Morris*, in 1883.

"One of the most abundant of the island ferns, growing along the roadsides, at 1500 to 2000 feet, in the neighbourhood of Joho's Hole, Sandy Bay Ridge, &c."—*Melliss.*

Whether regarded as a distinct species or only as a variety of *Polypodium punctatum*, this has a very wide area of distribution, though it does not appear to be a native of America.

Gymnogramme haughtoni, Hook.

Gymnogramme haughtoni, Hook. in Hook. and Bak., Synop. Fil., p. 381; Melliss, St Hel., p. 354.
Gymnogramme cordata, Schl., Adumbr., p. 16; Hook., Sp. Fil., v. p. 131, in part.
Grammitis cordata, Swartz, var. *sub-bipinnata*, Hook., 2nd Cent. Ferns, t. 7.

St Helena.—Endemic. On the Barn Rock—*Haughton;* from the ridge between James's and Rupert's Valleys—*Burchell*, 187, 188; without locality—*Dr Alexander; Morris*, in 1883.

"Somewhat rare, and mostly confined to the north and north-eastern parts of the island, such as the Barn, Rupert's Hill, Ladder Hill, High Knoll, and High Point, at 600 to 1600 feet."—*Melliss.*

Gymnogramme cordata, of which this is scarcely more than a variety, is common in South Africa.

Monogramme graminioides, Baker.

Monogramme graminioides, Baker in Hook. and Bak., Synop. Fil., p. 375; Melliss, St Hel., p. 354.
Monogramme furcata, Desv., Journ. de Bot., i. p. 23; Hook., Sp. Fil., v. p. 121.
Grammitis graminoides, Swartz, Synop. Fil., p. 22, t. 1, fig. 5.
Asplenium graminoides, Swartz, Fl. Ind. Occ., iii. p. 1608.
Pleurogramme graminoides, Fée, Gen. Fil., p. 101.
Cochlidium graminoides, Kaulf., Enum. Fil., p. 86; Schott, Gen. Fil., cum ic.

St Helena.—Indigenous? Without special locality—*Menzies.*

This miniature fern, recorded from Jamaica, Brazil, and Chili, is only represented in Kew Herbarium by one specimen, labelled "*Grammitis graminoides*, Sw., St Helena," in the handwriting of Menzies himself. Menzies touched at the island on his way to New Zealand and collected a few ferns, this apparently among them, though Sir W. Hooker (Sp. Fil., v. p. 122) says "possibly an error in the locality." It is true no other collector has found it in the island; but then, as the plant is very slender, and only about an inch high, it is probable that it has been overlooked.

Acrostichum dimorphum, Hook. and Grev.

Acrostichum dimorphum, Hook. and Grev., Ic. Fil., t. 145; Hook., Sp. Fil., v. p. 209; Hook. and Bak., Synop. Fil., p. 406; Hook., 2nd Cent. Ferns, t. 90; Kuhn, Fil. Afr., p. 44; Melliss, St Hel., p. 352.
Olfersia dimorpha, Presl., Tent. Pterid., p. 235.
Elaphoglossum dimorphum, Moore, Ind. Fil., iii. p. 355.
Microstaphyla furcata, Fée, viiième Mém. Fam. Foug., p. 45, t. 13, fig. 1, non Presl.

St Helena.—Endemic. On Halley's Mount and Sandy Bay—*Burchell*, 180; top of Diana's Peak, very common—*Hooker;* without locality—*Haughton; Shuter; Walker; Whitehead; Melliss;* and *Morris*, in 1883.

"On both sides of the Central Ridge, at 2000 to 2700 feet, above Swampy Gut, &c.; somewhat rare."—*Melliss.*

A distinct species, being the only one of the *Elaphoglossum* section that has the fronds distinctly incised or crenated.

Acrostichum (Elaphoglossum) bifurcatum, Swartz.

Acrostichum (Elaphoglossum) bifurcatum, Swartz, Synop. Fil., p. 12; Hook., Sp. Fil., v. p. 209; Roxb. in Beatson's St Helena Tracts, p. 296; Hook., 2nd Cent. Ferns, t. 91; Melliss, St Hel., p. 352.
Acrostrichum (Polybotrya) bifurcatum, Swartz; Hook. and Bak., Synop. Fil., p. 413.
Microstaphyla furcata, Presl, Epim. Bot., p. 160.
Anagramme paradoxa, Fée, Gen. Fil., p. 64.
Osmunda bifurcata, Jacq., Collect., iii. t. 20, fig. 2.
Gymnogramme bifurcata, Kunze in Linnæa, x. p. 496.
Darea furcans, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 269, t. 35, fig. 2 (sterile).
Polybotrya furcata, Mett. ex Kuhn, Fil. Afr., p. 52.
Filicula cornuta Insulæ Sanctæ Helenæ, Pluken., Phytogr., t. 350, fig. 4.

St Helena.—Endemic. On damp half-mouldered rocks near High Peak, and on the rocks at Flagstaff—*Burchell*, 177; wet rocks and mossy banks, abundant—*Hooker;* without locality—*Haughton; Cuming; Nuttall; Seemann; Lyall; Shuter; Lefroy; Lady Dalhousie;* and *Morris*, in 1883.

One of the commoner ferns of the island; according to Melliss, thickly covering the wet banks along the sides of the roads over Sandy Bay Ridge, at about 2000 feet.

Kuhn records this fern from Ascension, collected by Durville; but Bory cites St Helena as Durville's locality.

Acrostichum nervosum, Bory.

Acrostichum nervosum, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 252; Kuhn, Fil. Afr., p. 46.
Acrostichum (Olfersia) subdiaphanum, Hook. and Grev., Ic. Fil., t. 105; Hook., Sp. Fil., v. p. 225; Hook. and Bak., Synop. Fil., p. 416; Melliss, St Hel., p. 352.
Aconiopteris subdiaphana, Presl., Tent. Pterid., p. 236, t. 10, fig. 17.
Aconiopteris nervosa, J. Sm.
Acrostichum lanceolatum, Roxb. in Beatson's St Helena Tracts, p. 296.

St Helena.—Endemic. Diana's Peak—*Burchell*, 179; trunks of trees, top of Diana's Peak, rare—*Hooker;* amongst the grass on the highest ridge near Diana's Peak—*Haughton;* without locality—*Shuter; Nuttall; Morris*, in 1883.

One of the rarer ferns, found only in the most elevated parts of the Central Ridge.

Melliss erroneously records it as an inhabitant of Bourbon as well as of St Helena. It was originally published as a native of Madras in consequence of Dr Shuter sending it thence to Sir W. Hooker without locality.

Acrostichum (Elaphoglossum) conforme, Swartz.

Acrostichum (Elaphoglossum) conforme, Swartz, Synop. Fil., pp. 10 et 192, t. 1, fig. 1; Hook., Sp. Fil., v. p. 198; Hook. and Bak., Synop. Fil., p. 401; Kuhn, Fil. Afr., p. 43; Melliss, St Hel., p. 352.

St Helena.—Indigenous. On the stems of the Cabbage-trees on Diana's Peak—*Burchell*, 178; very rare, in shaded woods of Diana's Peak—*Hooker*; on *Dicksonia arborea*, Diana's Peak—*Melliss*; without locality—*Haughton*; *Morris*, in 1883.

A very widely diffused fern in warm regions of both the eastern and western hemispheres, and one of those found in Tristan da Cunha.

Melliss states that it is somewhat rare in St Helena. It is probable that this rather than *Acrostichum subdiaphanum* is the *Acrostichum lanceolatum* of Roxburgh. Fée (Acrost., p. 36, t. 7, fig. 1) records his *Acrostichum laurifolium* (which is different from *Acrostichum laurifolium*, Thouars, a synonym of *Acrostichum conforme*) from Bourbon and St Helena: the latter habitat being doubtless an error.

OPHIOGLOSSACEÆ.

Ophioglossum vulgatum, Linn., var.

Ophioglossum vulgatum, Linn., Sp. Pl., ed. 1, p. 1062, var.; Hook. and Bak., Synop. Fil., p. 445; Melliss, St Hel., p. 355.

Ophioglossum opacum, Carmich. in Trans. Linn. Soc. Lond., xii. p. 509; R. Br. ex Kuhn, Fil. Afr., p. 178.

Ophioglossum lusitanicum, Roxb. in Beatson's St Helena Tracts, p. 315?

St Helena.—Indigenous. In the driest and most sterile hills—*Burchell*, 196; without locality—*Haughton*; *Morris*, in 1883.

Melliss records it as plentiful on the barren rocky outskirts of the island, principally on the northern side. It is universally spread in tropical, temperate, and antarctic regions.

The form collected by Haughton in St Helena is exactly like Carmichael's from Tristan da Cunha, and Kuhn follows the latter in regarding it as a distinct species.

CRYPTOGAMÆ.—CELLULARES.

MUSCI.[1]

Dicranella (§ Campylopodium) proscripta, Hornsch.

Dicranella (§ Campylopodium) proscripta, Hornsch. in Hor. Phys. Berol., p. 60, t. 12 (*Didymodon*); Mitt. in Melliss's St Hel., p. 357.

Leptotrichum hornschuchii, C. Müll., Synop. Musc. Frond., i. p. 450.

Dicranella cygnea, J. Angstr. in Hedwigia, 1875, p. 92.

St Helena.—Endemic. Common, and gathered by all collectors.

[1] Mainly extracted from Mitten's enumeration of the *Musci* and *Hepaticæ* in Melliss's St Helena.

Dicranella condensata, J. Angstr.

Dicranella condensata, J. Angstr., in Hedwigia, 1875, p. 92.

St Helena.

The description of this seems to indicate *Dicranella ascensionica*, Mitt.; but this species is absent in all our collections from St Helena.

Campylopus introflexus, Hedw.

Campylopus introflexus, Hedw., Sp. Musc., t. 20 (*Dicranum*); Mitt. in Melliss's St Hel., p. 358.

St Helena.—Damp banks on the high land—*Burchell; Melliss.*

A common moss both in the northern and southern hemispheres.

Campylopus helenicus, C. Müll.

Campylopus helenicus, C. Müll, Synop. Musc. Frond., ii. p. 599 (*Dicranum*); Mitt. in Melliss's St Hel., p. 358.

St Helena.—Endemic.

One of the commoner species, figuring in every collection.

Campylopus scabricuspis, Mitt.

Campylopus scabricuspis, Mitt. in Melliss's St Hel., p. 358.

St Helena.—Endemic. Damp roadside banks on the high land—*Melliss.*

Glyphomitrium helenicum, Mitt.

Glyphomitrium helenicum, Mitt. in Melliss's St Hel., p. 359.

St Helena.—Endemic.

Only collected by Captain Haughton.

Ceratodon purpureus, Linn.

Ceratodon purpureus, Linn. (*Mnium*); C. Müll., Synop. Musc. Frond., i. p. 646; Melliss, St Hel., p. 359.

St Helena. Damp banks on the high land—*Burchell; Melliss.*

The most widely diffused of all mosses.

Tortula crispula, Bruch.

Tortula crispula, Bruch. (*Trichostomum*); C. Müll., Synop. Musc. Frond., i. p. 571; Melliss, St Hel., p. 360.

St Helena.—Indigenous? Old walls and stones in the high land—*Melliss.*

Europe; North Africa.

Tortula cæspitosa, Schwægrichen.

Tortula cæspitosa, Schwægrichen, t. 31; Mitt. in Melliss's St Hel., p. 360.

St Helena.—Indigenous? Old stone walls on the high land—*Melliss.*

South America and South Africa.

Macromitrium (Macrocoma) microphyllum, Hooker.

Macromitrium (*Macrocoma*) *microphyllum*, Hooker et Greville in Brewster's Edinb. Journ., i. p. 121, t. 6 (*Orthotrichum*); Mitt. in Melliss's St. Hel., p. 360.

St Helena. *Melliss.*

South Africa; Australia; New Zealand.

Macromitrium (Goniostoma) urceolatum, Hooker.

Macromitrium (*Goniostoma*) *urceolatum*, Hooker, Musci Exotici, t. 124 (*Orthotrichum*); Mitt. in Melliss's St Hel., p. 360.

St Helena. *Menzies*, 1798; *Haughton; Melliss.*

South America; Juan Fernandez.

Macromitrium (Goniostoma) seemanni, Mitt.

Macromitrium (*Goniostoma*) *seemanni*, Mitt. in Journ. Linn. Soc. Lond., iii. Suppl., p. 51; and in Melliss's St Hel., p. 360.

St Helena.—Endemic? Summit of Diana's Peak, &c.—*Burchell; Seemann; Melliss.*

It is most probable that the specimen of this species from Dickson, marked as from the East Indies, and now preserved in the Kew Herbarium, was really gathered in St Helena.

Physcomitrium flexifolium, Mitt.

Physcomitrium flexifolium, Mitt. in Melliss's St. Hel., p. 361.

St Helena.—Endemic. Only collected by *Burchell.*

Bartramia (Philonitis) heleniana, Mitt.

Bartramia (*Philonitis*) *heleniana*, Mitt. in Melliss's St Hel., p. 361.

St Helena.—Endemic. Only collected by *Burchell.*

Very closely allied to, and perhaps not specifically different from, the common *Bartramia fontana.*

Specimens of another species were gathered by Mr Melliss, indicating a small species

with plumose foliage on stems less than half an inch high; but they are insufficient to afford any character.

Bryum argenteum, Linn.

Bryum argenteum, Linn., Sp. Pl., ed. 2, p. 1586; C. Müll., Synop. Musc. Frond., i. p. 314 (*β lanatum*); Melliss, St Hel., p. 362.

St Helena.

Generally diffused.

Two other species of *Bryum* exist in St Helena, but the specimens are insufficient for determination. One is near to the Brazilian *Bryum rigidum*, and the other may be one of the forms of the common *Bryum dichotomum*.

Hookeria (Omaliadelphus) pallidifolia, Mitt.

Hookeria (*Omaliadelphus*) *pallidifolia*, Mitt. in Melliss's St Hel., p. 362.

St Helena.—Endemic. Amongst the grass on the high land—*Hooker; Melliss.*

Sematophyllum (Rhaphidorrhynchum) helenicum, Mitt.

Sematophyllum (*Rhaphidorrhynchum*) *helenicum*, Mitt. in Melliss's St Hel., p. 363.

St Helena.—Endemic. On bark—*Melliss.*

Sematophyllum (Rhaphidorrhynchum) plumularium, Mitt.

Sematophyllum (*Rhaphidorrhynchum*) *plumularium*, Mitt. in Melliss's St Hel., p. 364.
Hypnum (*Sematophyllum*) *erythrocaulon*, J. Angstr. in Hedwigia, 1875, p. 92?.

St Helena.—Endemic. On bark—*Melliss.*

Pleurozium splendens, Hedwig.

Pleurozium splendens, Hedwig, Sp. Musc., p. 262, t. 67 (*Hypnum*); C. Müll., Synop. Musc. Frond. ii. p. 457; Melliss, St Hel., p. 364.

St Helena.—Indigenous?

Only collected in the island by Sir J. D. Hooker.

Generally diffused in the north temperate zone, and extending southward to the Canaries, &c.

Hypnum (Argyrodinum) purum, Linn.

Hypnum (*Argyrodinum*) *purum*, Linn., Sp. Pl., ed. 2, p. 1594; C. Müll., Synop. Musc. Frond., ii. p. 379; Melliss, St Hel., p. 364.

St Helena.—Indigenous? Among grass on the high land at Rock Cottage, &c.—*Melliss.*

Europe; North America.

Hypnum (Rhynchostegium) prælongum, Linn.

Hypnum (Rhynchostegium) prælongum, Linn., Sp. Pl. ed., p. 1591; C. Müll., Synop. Musc. Frond., ii. p. 446; Mitt. in Melliss's St Hel., p. 365.

St Helena.—Indigenous? Collected by *Haughton* and *Melliss*.

All over Europe; also in Madeira, South America, &c.

Hypnum (Brachythecium) athrocladum, Mitt.

Hypnum (Brachythecium) athrocladum, Mitt. in Melliss's St Hel., p. 365.

St Helena.—Endemic.

Only collected by *Burchell*.

Fissidens helenicus, Mitt.

Fissidens helenicus, Mitt. in Melliss's St Hel., p. 366, t. 56, fig. A.

St Helena.—Endemic. *Burchell; Haughton.*

This is perhaps the *Fissidens chioneurus*, C. Müll., in Linnæa, xxxvii. p. 167, a species described from a St Helena specimen.

HEPATICÆ.

Plagiochila insularis, Mitt.

Plagiochila insularis, Mitt. in Melliss's St Hel., p. 366.

St Helena.—Endemic. *Haughton; Melliss.*

Fragments of another species, like very small states of *Plagiochila spinulosa*, have been seen from St Helena.

Jungermannia obtusata, Tayl.

Jungermannia obtusata, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 80; Mitt. in Melliss's St Hel., p. 367.

St Helena.—Endemic. *Hooker; Haughton.*

G. L. S. (Synop. Hepat., p. 664) reduces this to *Jungermannia subcomplicata*.

Lophocolea humistrata, Tayl.

Lophocolea humistrata, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 82; Mitt. in Melliss's St Hel., p. 367.

St Helena.—Endemic. *Hooker; Haughton.*

Lophocolea bidentata, Nees.

Lophocolea bidentata, Nees, Hepat. Eur., ii. p. 327; G. L. S., Synop. Hepat., p. 159.

St Helena.—In large patches, but barren—*Mrs Wilde.*

Adelocolia decipiens, Mitt.

Adelocolia decipiens, Mitt., MSS.
Adelanthus decipiens, Hook., Brit. Jung., t. 50 (*Jungermannia*); Mitt. in Journ. Linn. Soc. Lond., vii. p. 244, et in Melliss's St Hel., p. 368.
Plagiochila decipiens, Mont. et Nees, Hepat. Eur., iii. p. 518; G. L. S., Synop. Hepat., p. 24.
Jungermannia campylodonta, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 80.
Plagiochila campylodonta, G. L. S., Synop. Hepat., p. 639.

St Helena.—Indigenous? On moist ground, Diana's Peak—*Hooker;* creeping amongst *Macromitrium seemanni*—*Seemann.*

Ireland; North America; Andes of South America.

The name *Adelanthus* being previously in use, it has been necessary to alter it.

Tylimanthus anisodon, Tayl.

Tylimanthus anisodon, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 79 (*Plagiochila*); Mitt. in Melliss's St Hel., p. 368.

St Helena.—Endemic. *Hooker.*

Lepidozia capillaris, Swartz.

Lepidozia capillaris, Swartz (*Jungermannia*); G. L. S., Synop. Hepat., p. 213; Mitt. in Melliss's St Hel., p. 369.
Lepidozia nemoides, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 84.

St Helena. *Hooker; Haughton.*

West Indies; South Africa; New Zealand, &c.

Physiotium sphagnoides, Hooker.

Physiotium sphagnoides, Hooker, Musci Exotici, t. 47 (*Jungermannia*); G. L. S., Synop. Hepat., p. 235; Mitt. in Melliss's St Hel., p. 370.

St Helena. *Menzies; Burchell; Hooker; Melliss.*

West Africa; Mascarene Islands; Java.

Radula fulvifolia, Tayl.

Radula fulvifolia, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 85; Mitt. in Melliss's St Hel., p. 370.

St Helena.—Endemic. *Hooker; Haughton; Melliss.*

Phragmicoma acutiloba, Tayl.

Phragmicoma acutiloba, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 90; Mitt. in Melliss's St Hel., p. 370.

St Helena.—Endemic. Diana's Peak—*Hooker.*

Phragmicoma rotalis, Tayl.

Phragmicoma rotalis, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 89; Mitt. in Melliss's St Hel., p. 371.

St Helena.—Endemic. *Hooker; Haughton; Seemann; Melliss.*

Phragmicoma microscypha, Tayl.

Phragmicoma microscypha, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 90.

St Helena.—Endemic. *Hooker.*

Lejeunia pterota, Tayl.

Lejeunia pterota, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 91; Mitt. in Melliss's St Hel., p. 371.

Lejeunia adscensionis, Tayl., l. c.

St Helena. *Hooker.*

Also in Ascension.

Pallavicinius procumbens, Tayl.

Pallavicinius procumbens, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 93 (*Diplolæna*); Mitt. in Melliss's St Hel., p. 371.

St Helena.—Endemic. *Hooker; Haughton; Melliss.*

Plagiochasma limbatum, Tayl.

Plagiochasma limbatum, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 95 (*Jungermannia*); Mitt. in Melliss's St Hel., p. 371.

St Helena. *Haughton.*

Also in Ascension.

Symphogyna serrata, Mitt.

Symphogyna serrata, Mitt. in Melliss's St Hel., p. 372.

St Helena.—Endemic. *Haughton.*

Exormotheca pustulosa, Mitt.

Exormotheca pustulosa, Mitt. in Godman, Nat. Hist. Azores, p. 325, et in Melliss's St Hel., p. 372.

St Helena. *Melliss.*

There is a little uncertainty about this being the same as the Azores plant.

Marchantia polymorpha, Linn.

Marchantia polymorpha, Linn.; G. L. S., Synop. Hepat., p. 522; Mitt. in Melliss's St Hel., p. 372.

St Helena.—Central ridge; abundant—*Melliss.*

Generally diffused.

Dendroceros adglutinatus, Tayl.

Dendroceros adglutinatus, Tayl. in Hook., Lond. Journ. Bot., 1845, p. 96 (*Monoclea*); Mitt. in Melliss's St Hel., p. 372.

St Helena.—Endemic. On trees, Diana's Peak—*Hooker; Burchell.*

Anthoceros lævis, Linn.

Anthoceros lævis, Linn.; G. L. S., Synop. Hepat., p. 586; Mitt. in Melliss's St Hel., p. 373.

St Helena. *Melliss.*

Widely dispersed.

LICHENES.[1]

COLLEMACEI.

Collemei.

Leptogium tremelloides, Fries.

Leptogium tremelloides, Fries; Nyl., Synop. Lich., i. p. 124; Leighton, Trans. Linn. Soc. Lond., xxvii. p. 155, et in Melliss's St Hel., p. 373.

St Helena. *Burchell; Melliss.*

Almost cosmopolitan, except in the colder regions.

LICHENACEI.

Cladoniei.

Cladonia pyxidata, Fries.

Cladonia pyxidata, Fries; Nyl., Synop. Lich., i. p. 192; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 155, et in Melliss's St Hel., p. 373.

St Helena. *Burchell; Melliss.*

Mr Leighton enumerates three forms, namely, *denticulata*, *decorticata*, and *chlorophæa*, of which the two first are regarded by Nylander as distinct species.

Generally diffused both in the Northern and Southern Hemispheres.

Cladonia aggregata, Eschw.

Cladonia aggregata, Eschw.; Nyl., Synop. Lich., i. p. 218; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 155, et in Melliss's St Hel., p. 373.

St Helena. *Burchell.*

[1] The whole of these lichens were collected by Burchell and Melliss, and the enumeration was originally published by the Rev. W. A. Leighton in the *Transactions of the Linnean Society of London* (xxvii. p. 155). Concerning the collections Mr Leighton says: "Though not numerous, they are highly interesting and instructive, as well from their insular locality itself, as more especially from their approximate similarity to the *Lichenes Amazonici et Andini.*"

Fragments only, and doubtfully belonging to this species.

West Indies; South America; Africa; Mascarene Islands; Southern Asia; Australia; New Zealand; and the Antarctic Islands.

ROCCELLEI.

Roccella tinctoria, DC.

Roccella tinctoria, DC.; Nyl., Synop. Lich., i. p. 258; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 155, et in Melliss's St Hel., p. 373.

ST HELENA. *Melliss.*

Canary Islands; Senegambia; Cape of Good Hope; East India; Central and South America; and also in the islands of the Mediterranean Sea; but here, according to Nylander, represented by a form approaching *Roccella phycopsis.*

Roccella phycopsis, Acharius.

Roccella phycopsis, Acharius; Nyl., Synop. Lich., i. p. 259; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 155, et in Melliss's St Hel., p. 373.

ST HELENA. *Burchell; Melliss.*

Mediterranean; Western Europe; Canaries; Ascension; Peru; and Madagascar.

Roccella fuciformis, Acharius.

Roccella fuciformis, Acharius; Nyl., Synop. Lich., i. p. 260; Leighton in Melliss's St Hel., p. 373.

ST HELENA. *Melliss.*

Mediterranean; Western Europe; Canaries; South America; Western and South Africa; and Mauritius.

USNEEI.

Usnea barbata, Fries.

Usnea barbata, Fries; Nyl., Synop. Lich., i. p. 267; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 374 (formæ: *florida*, *hirta*, *ceratina*, et *articulata*).

ST HELENA. *Burchell; Melliss.*

Generally diffused.

[*Usnea leucochlora*, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 241, St Helena, Durville, is unknown to us.]

Usnea lævis, Nyl.

Usnea lævis, Nyl., Synop. Lich., i. p. 271; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 271, et in Melliss's St Hel., p. 374.

ST HELENA. *Burchell.*

RAMALINEI.

Ramalina scopulorum, Acharius.

Ramalina scopulorum, Acharius; Nyl., Synop. Lich., i. p. 292; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 374.

ST HELENA. *Melliss.*

From Lapland and Iceland to the Cape of Good Hope; also in North America, China, New Zealand, &c.

Ramalina polymorpha, Acharius.

Ramalina polymorpha, Acharius; Nyl., Synop. Lich., i. p. 293; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 374.

ST HELENA. *Melliss.*

Widely diffused.

Ramalina pollinaria, Acharius.

Ramalina pollinaria, Acharius; Nyl., Synop. Lich., i. p. 296; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 374.

ST HELENA. *Burchell.*

Widely diffused.

Ramalina ceruchis, De Notaris.

Ramalina ceruchis, De Notaris; Nyl., Synop. Lich., i. p. 289; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 375.

ST HELENA. *Burchell.*

South America.

Ramalina angulosa, Laur.

Ramalina angulosa, Laur.; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 374 (*formæ* 3).

Ramalina scopulorum, var. *implexa*, Nyl., Synop. Lich., i. p. 293.

ST HELENA. *Burchell.*

South Africa.

STICTEI.

Stictina crocata, Nyl.

Stictina crocata, Nyl., Synop. Lich., i. p. 338; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 375.

ST HELENA. *Melliss.*

Very widely spread.

Stictina tomentosa, Nyl.

Stictina tomentosa, Nyl., Synop. Lich., i. p. 343; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 375.

St Helena. *Burchell; Melliss.*

Sticta aurata, Acharius.

Sticta aurata, Acharius; Nyl., Synop. Lich., i. p. 361; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 375.

St Helena. *Burchell; Melliss.*

Very widely spread.

Ricasolia herbacea, De Notaris.

Ricasolia herbacea, De Notaris; Nyl., Synop. Lich., i. p. 369; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 375.

St Helena. *Burchell.*

Specimen fragmentary, and uncertain as to the species.

Widely spread.

PARMELIEI.

Parmelia saxatilis, Acharius.

Parmelia saxatilis, Acharius; Nyl., Synop. Lich., i. p. 388; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 376.

St Helena. *Burchell; Melliss.*

Widely spread.

Parmelia perlata, Acharius.

Parmelia perlata, Acharius; Nyl., Synop. Lich., i. p. 379; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 375.

St Helena. *Melliss.*

Cosmopolitan, except in the colder regions.

Parmelia lævigata, Acharius.

Parmelia lævigata, Acharius; Nyl., Synop. Lich., i. p. 384; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 376.

St Helena. *Burchell.*

Cosmopolitan, except in the colder regions.

Parmelia caperata, Acharius.

Parmelia caperata, Acharius; Nyl., Synop. Lich., i. p. 376; Leighton in Melliss's St Hel. p. 376.

St Helena. *Melliss.*

Widely spread.

Parmelia conspersa, Acharius, forma *mougeotii*.

Parmelia conspersa, Acharius; Nyl., Synop. Lich., i. p. 391 et 392; Leighton in Melliss's St Hel., p. 376 (forma *mougeotii*).

St Helena. *Melliss.*

Very widely diffused. Nylander regards this form as a distinct species.

Parmelia incurva, Fries?

Parmelia incurva, Fries?; Nyl., Synop. Lich., i. p. 394; Leighton in Melliss's St Hel., p. 376.

St Helena. *Melliss.*

Europe; North America.

Parmelia hyperopta, Acharius?

Parmelia hyperopta, Acharius?; Leighton in Melliss's St Hel., p. 376.

St Helena. *Melliss.*

Parmelia hyperopta, Acharius, is reduced to *Parmelia ambigua* by Fries (Lich. Europ., p. 71), which Nylander now refers to the genus *Squamaria*.

Parmelia lepidiota, Smrf.

Parmelia lepidiota, Smrf.; Leighton in Melliss's St Hel., p. 376.

St Helena. *Melliss.*

Physciei.

Physcia flavicans, DC.

Physcia flavicans, DC.; Nyl., Synop. Lich., i. p. 406; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 376.

St Helena. *Burchell; Melliss.*

Widely dispersed.

Physcia leucomela, Michx., forma *angustifolia*.

Physcia leucomela, Michx.; Nyl., Synop. Lich., i. p. 414; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 376 (forma *angustifolia*).

St Helena. *Burchell; Melliss.*

Widely spread.

Physcia speciosa, Fries, var. *hypoleuca*.

Physcia speciosa, Fries; Nyl., Synop. Lich., i. p. 416; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 156, et in Melliss's St Hel., p. 376 (var. *hypoleuca*).

St Helena. *Burchell; Melliss.*

This variety is widely dispersed, especially in warm regions.

Physcia astroidea, Fries.

Physcia astroidea, Fries; Nyl., Synop. Lich., i. p. 426; Leighton in Melliss's St. Hel., p. 376.

St Helena. *Melliss.*

Central and Southern Europe, and North Africa.

Physcia picta, Nyl.

Physcia picta, Nyl., Synop. Lich., i. p. 430; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, et in Melliss's St. Hel., p. 376.

St Helena.—*Melliss.*

Widely spread.

LECANOREI.

Pannaria rubiginosa, Del.

Pannaria rubiginosa, Del.; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, et in Melliss's St Hel., p. 376.

St Helena. *Burchell; Melliss.*

Very widely spread.

Erioderma unguigerum, Fée.

Erioderma unguigerum, Fée; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, et in Melliss's St Hel., p. 377.

St Helena. *Burchell; Melliss.*

Burchell's St Helena specimens of this lichen in Kew Herbarium are named *Erioderma polycarpum* in the handwriting of Leighton; and one collected by Sir J. D. Hooker is named *Erioderma unguigerum* by Nylander.

Cora pavonia, Web.

Cora pavonia, Web.; Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, et in Melliss's St Hel., p. 377.

St Helena. *Burchell; Melliss.*

West Indies; South America.

Squamaria saxicola, Nyl.

Squamaria saxicola, Nyl., Prodr., p. 70, et. Lich. Scand., p. 133; Leighton in Melliss's St Hel., p. 377.

St Helena. *Melliss.*

Widely spread in the Northern Hemisphere.

Placodium murorum, DC.?

Placodium murorum, DC., Fl. Fr., ii. p. 378? Leighton in Melliss's St Hel., p. 377.

St Helena. *Melliss.*

A widely dispersed lichen.

Lecanora personata, Leighton.

Lecanora personata, Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, t. 35, et in Melliss's St Hel., p. 377.

St Helena.—Endemic. *Burchell.*

Lecanora aurantiaca (Lightf.)

Lecanora aurantiaca (Lightf.); Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, et in Melliss's St Hel., p. 377.

St Helena. *Melliss.*

Widely spread.

Lecanora atra, Acharius?

Lecanora atra, Acharius, Lich. Univ., p. 344, et Synop. Lich., p. 143? Leighton in Melliss's St Hel., p. 377.

St Helena. *Melliss.*

A cosmopolitan species.

Lecanora ferruginea, Nyl.?

Lecanora ferruginea, Nyl., Prodr., p. 76, et Lich. Scand., p. 143? Leighton in Melliss's St Hel., p. 377.

St Helena. *Melliss.*

Widely spread.

Lecanora argopholis, Acharius.

Lecanora argopholis, Acharius, Lich. Univ., p. 346; Leighton in Melliss's St Hel., p. 377.

St Helena. *Melliss.*

Europe; America; New Zealand.

Lecanora orosthea, Acharius.

Lecanora orosthea, Acharius, Lich. Univ., p. 400; Nyl. Lich. Scand., p. 165; Leighton in Melliss's St Hel., p. 377.

St Helena. *Melliss.*

Europe.

Lecanora hæmatomma, Acharius.

Lecanora hæmatomma, Acharius, Lich. Univ., p. 388, et Synop. Lich., p. 178; Leighton in Melliss's St Hel., p. 378.

St Helena. *Melliss.*

Widely dispersed.

Lecanora fuscolutea, Dicks.

Lecanora fuscolutea, Dicks., Br. Crypt., ii. p. 18; Nyl. Lich. Scand., p. 146; Leighton in Melliss's St Hel., p. 378.

St Helena. *Melliss.*

Widely dispersed.

Pertusaria fallax, Pers.

Pertusaria fallax, Pers. in Acharius Synop. Lich., p. 110; Leighton in Melliss's St Hel., p. 378.

St Helena. *Melliss.*

Europe; Atlantic Islands.

THELOTREMEI.

Urceolaria scruposa, Acharius.

Urceolaria scruposa, Acharius, Meth. Lich., p. 147, et Lich. Univ., p. 338; Leighton in Melliss's St Hel., p. 378.

St Helena. *Melliss.*

Cosmopolite.

LECIDEI.

Lecidea approximans, Leight.

Lecidea approximans, Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, t. 35, et in Melliss's St Hel., p. 378.

St Helena.—Endemic. *Burchell.*

Lecidea lactescens, Leight.

Lecidea lactescens, Leighton in Trans. Linn. Soc. Lond., xxvii. p. 157, t. 35, et in Melliss's St Hel., p. 378.

St Helena.—Endemic. *Burchell.*

Lecidea saxatilis, Nyl.?

Lecidea saxatilis, Nyl., Lich. Scand., p. 237? Leighton in Melliss's St Hel., p. 378.

St Helena. *Melliss.*

Lecidea enteroleuca, Acharius.

Lecidea enteroleuca, Acharius, Lich. Univ., p. 177, et Synop. Lich., p. 19; Leighton in Melliss's St Hel., p. 378.

St Helena. *Melliss.*

Europe, &c.

Opegrapha leightonii, Cromb.

Opegrapha leightonii, Crombie in Leight. Lich. Fl. Brit., p. 409; Leighton in Melliss's St Hel., p. 378.

St Helena. *Melliss.*

Europe, &c.

Lepraria ochracea, T. & B.

Lepraria ochracea, T. & B.; Leighton in Melliss's St Hel., p. 379.

St Helena. *Melliss.*

Europe, &c.

Lepraria flava, Acharius.

Lepraria flava, Acharius, Lich. Univ., p. 663, et Meth. Lich., p. 180; Leighton in Melliss's St Hel., p. 379.

St Helena. *Melliss.*

FUNGI.

HYMENOMYCETES.

Agaricus (Amanita) pantherinus, DC.

Agaricus (Amanita) pantherinus, DC., Fl. Fr., vi. p. 52; Fries, Hymen. Europ., p. 21; Berkl. in Melliss's St Hel., p. 379.

St Helena. *Melliss.*

Europe; North America.

Agaricus (Psalliota) campestris, Linn.

Agaricus (Psalliota) campestris, Linn., Sp. Pl., 2d ed., p. 1641; Fries, Hymen. Europ., p. 279; Berkl. in Melliss's St Hel., p. 379.

St Helena.—Abundantly on the grassy plains at Deadwood, Man and Horse, New Ground, &c.—*Melliss.*[1]

North and south temperate regions; also from Ceylon, Java, Guiana, and Brazil.

[1] Melliss mentions that a larger species of *Agaricus* inhabits the rotting beds of haystacks; and a still larger one, about eight or ten inches in diameter, is occasionally met with on the barren plains between Longwood and Turk's Cap.

Agaricus (Hypholoma) fascicularis, Huds.

Agaricus (Hypholoma) fascicularis, Huds., Fl. Angl., 2d ed., p. 615; Fries, Hymen. Europ. p. 291?, Berkl. in Melliss's St Hel., p. 379.

St Helena. *Melliss.*

The true plant is widely dispersed in both north and south temperate regions.

Schizophyllum commune, Fries.

Schizophyllum commune, Fries, Syst. Mycol., i. p. 330; Berkl. in Melliss's St Hel., p. 380.

St Helena. *Melliss.*

Ubiquitous.

Polyporus lucidus, Fries.

Polyporus lucidus, Fries, Hymen. Europ., p. 536; Berkl. in Melliss's St Hel., p. 380.

St Helena.—Without locality—*Melliss.*

A cosmopolitan species.

Polyporus sanguineus, Mey.?

Polyporus sanguineus, Mey., Esseq., p. 304; Fries, Syst. Mycol., i. p. 371?; Berkl. in Melliss's St Hel., p. 380.

St Helena. *Melliss.*

Specimen quite colourless from exposure to weather.

Polyporus (Anodermei) induratus, Berkl.

Polyporus (Anodermei) induratus, Berkl. in Melliss's St Hel., p. 380, t. 56.

St Helena.—Endemic. Abundant on the trunks of trees that lie rotting on the high land at 1600 to 2000 feet—*Melliss.*

"Pileo ungulato e tomentoso pallide sublaccato, poris elongatis albis minutis angulatis, dissepimentis tenuibus, contextu fibroso-sericeo."

Polyporus versicolor, Fries.

Polyporus versicolor, Fries, Syst. Mycol., i. p. 368; Hymen., Europ., p. 568; Berkl. in Melliss's St Hel., p. 380.

St Helena.—Without locality—*Melliss.*

This is a European species, and it is also recorded from India, Siberia, United States, Mexico, Cuba, Guadaloupe, Brazil, Juan Fernandez, Cape of Good Hope, New Zealand, Tasmania, Australia, and Java.

GASTEROMYCETES.

Phallus impudicus, Linn. ?

Phallus impudicus, Linn. ? Berkl. in Melliss's St Hel., p. 379.

St Helena.—This stinking fungus is often met with after heavy rains forcing its way out of the earth in the wooded parts on the high land"—*Melliss.*

Scleroderma vulgare, Fries.

Scleroderma vulgare, Fries, Syst. Mycol., iii. p. 46; Berkl. in Melliss's St. Hel., p. 380.

St Helena.—Very common on the high land, along roadside banks, and in the wooded parts—*Melliss.*

Europe; North America; Madeira; New Zealand; Tasmania.

ASCOMYCETES.

Xylaria mellissii, Cooke.

Xylaria mellissii, Cooke, Grevillea, xi. p. 85.
Hypoxylon mellissii, Berkl. in Melliss's St Hel., p. 379.

St Helena.—Endemic. On the decaying trunk of an old cork tree, the Hermitage—*Melliss.*

ALGÆ.

MELANOSPERMEÆ.[1]

Dictyotaceæ.

Padina pavonia, Gaill.

Padina pavonia, Gaill.; Dickie in Journ. Linn. Soc. Lond., xiii. p. 178; Melliss, St Hel., p. 383.

St Helena.—From the basaltic rocks and small shallow pools of sea-water on Lot's Wife beach, on the windward side of the island—*Melliss.*

Generally spread.

[1] Dr Dickie states (*Journ. Linn. Soc. Lond.*, xiii. p. 178) that Mr Melliss sent him the root and part of the stem of a large species several feet in length, which is cast ashore in a battered condition on the southern side of the island. From its structure Dr Dickie supposed it to be the *Ecklonia buccinalis*, Hornem., a common species at the Cape of Good Hope, whence it doubtless drifted to St Helena, as a strong current prevails from that part.

RHODOSPERMEÆ.

LAURENCIACEÆ.

Laurencia cruciata, Harv.

Laurencia cruciata, Harv. ex Dickie in Journ. Linn. Soc. Lond., xiii. p. 179; Melliss, St Hel., p. 383.

ST HELENA.—Growing in the shallow pools on the windward coast; not common—*Melliss.*

Besides those from St Helena, we have only seen specimens of this species from Freemantle, West Australia, and Howick Islands, Queensland; but it is nearly allied to *Laurencia obtusa*, Lamour., a very widely diffused species.

CORALLINACEÆ.

Corallina carinata, Kütz.

Corallina carinata, Kütz. ex Dickie in Journ. Linn. Soc. Lond., xiii. p. 179; Melliss, St Hel., p. 383.

ST HELENA.—Shallow pools—*Melliss.*

Cape of Good Hope; Rio Janeiro.

Amphiroa fragilissima, Lamour.

Amphiroa fragilissima, Lamour.; Dickie in Journ. Linn. Soc. Lond., xiii. p. 179; Melliss, St Hel., p. 382.

ST HELENA.—Very rare in the pools at Lot's Wife ponds—*Melliss.*

This species has a wide distribution.

Amphiroa exilis, Harv.?

Amphiroa exilis, Harv.? Dickie in Journ. Linn. Soc. Lond., xiii. p. 179; Melliss, St Hel., p. 382.

ST HELENA.—Rare in shallow pools on the windward coast—*Melliss.*

We have only seen specimens of this species from Rio Janeiro, but Dickie states that it occurs at the Cape of Good Hope and in the Mediterranean.

Lithothamnion crassum, Philippi.

Lithothamnion crassum, Philippi in Wiegm. Arch., 1837, p. 389; Dickie in Journ. Linn. Soc., Lond., xiii. p. 179; Melliss, St Hel., p. 382.

Spongites racemosa, Kütz., Phyc. Gener., p. 386, t. 78, fig. 3, et Sp. Alg., p. 698.

ST HELENA.—Found with the next, but neither species is abundant—*Melliss.*

Only recorded from the Mediterranean and Adriatic.

Lithothamnion brassica-florida, Harv.

Lithothamnion brassica-florida, Harv. ex Dickie in Journ. Linn. Soc. Lond., xiii. p. 179; Melliss, St Hel., p. 382.

St Helena.—Growing to some extent in the shallow pools, and also cast up with the shingle on the beach along the southern or windward coast. It is a good deal perforated by a small *Lithodomus*, the shells of which are found perfect in some of the holes—*Melliss.*

Also found in Algoa Bay.

Melobesia farinosa, Lamour.

Melobesia farinosa, Lamour., Polyp. Flex., p. 315, t. 12; Kütz., Sp. Alg., p. 696; Dickie in Journ. Linn. Soc. Lond., xiii. p. 179; Melliss, St Hel., p. 382.

St Helena.—Found adhering to *Laurencia cruciata—Melliss.*

Widely spread in the Atlantic and Pacific; also in the Mediterranean, and on the coast of Eastern Australia.

GELIDIACEÆ.

Pterocladia lucida, R. Br.

Pterocladia lucida, R. Br. ex J. G Agardh, Sp. Alg., iii. p. 545; Harv., Phyc. Austr., t. 248; Dickie in Journ. Linn. Soc. Lond., xiii. p. 170; Melliss, St Hel., p. 382.

St Helena.—Growing on limpet shells, which are cast ashore rather plentifully along the coast—*Melliss.*

Common on the western and south-western and eastern coasts of Australia and New Zealand; also occurring on the coast of Ceylon. The specimens from St Helena are very small, only about an inch high; but Dr Dickie states that there is doubt as to the genus or species.

HELMINTHOCLADEÆ.

Liagora viscida, K. A. Agardh.

Liagora viscida, K. A. Agardh, Sp. Alg., i. p. 395; Kütz., Sp. Alg., p. 538; Dickie in Journ. Linn. Soc. Lond., xiii. p. 180; Melliss, St Hel., p. 382.

St Helena.—In shallow pools on the windward coast; rare—*Melliss.*

Azores; Mediterranean; Red Sea; Ceylon; Mauritius; Eastern Australia; West Indies.

Galaxaura lapidescens, Lamour.

Galaxaura lapidescens, Lamour.; Dickie in Journ. Linn. Soc. Lond., xiii. p. 180; Melliss, St Hel., p. 381.

St Helena.—Shallow pools; rare—*Melliss.*

Atlantic; Polynesia; Sandwich Islands; Mauritius.

Cryptonemiaceæ.

Grateloupia filicina, K. A. Agardh.

Grateloupia filicina, K. A. Agardh, Sp. Alg., i. p. 223; Kütz., Sp. Alg., p. 730; Dickie in Journ. Linn. Soc. Lond., xiii. p. 180; Melliss, St Hel., p. 381.

St Helena.—Rather common—*Melliss.*

Both the ordinary form and the var. *ramentacea* occur.

Generally diffused.

Ceramiaceæ.

Centroceras clavulatum, J. G. Agardh.

Centroceras clavulatum, J. G. Agardh, Sp. Alg., ii. p. 148; Dickie in Journ Linn. Soc. Lond., xiii. p. 180; Melliss, St Hel., p. 381.

St Helena.—Found adhering to *Corallina carinata*—*Melliss.*

Generally diffused.

Griffithsia setacea, K. A. Agardh.

Griffithsia setacea, K. A. Agardh, Sp. Alg., ii. p. 129; Kütz., Sp. Alg., p. 660; Dickie in Journ. Linn. Soc. Lond., xiii. p. 180; Melliss, St Hel., p. 381.

St Helena.—Adhering to *Laurencia cruciata*—*Melliss.*

Eastern North Atlantic; Mediterranean; New Zealand; Tasmania.

CHLOROSPERMEÆ.

Siphonaceæ.

Codium tomentosum, K. A. Agardh.

Codium tomentosum, K. A. Agardh, Sp. Alg., i. p. 452; Dickie in Journ. Linn. Soc. Lond., xiii. p. 180; Melliss, St Hel., p. 381.

St Helena.—In pools on the windward coast; very rare—*Melliss.*

Generally diffused.

Valoniaceæ.

Valonia verticillata, Kütz.

Valonia verticillata, Kütz., Sp. Alg., p. 508? Dickie in Journ. Linn Soc. Lond., xiii. p. 181; Melliss, St Hel., p. 381.

St Helena.—Rare in pools—*Melliss.*

Mr Moseley collected the typical plant in the Cape Verde Islands; Kützing states that it is found "ad insulam Sanctæ Crucis," which by a slip is given as Vera Cruz by Dickie, whom Melliss follows.

Ulvaceæ.

Ulva latissima, Kütz.

Ulva latissima, Kütz.; Dickie in Journ. Linn. Soc. Lond., xiii. p. 181; Melliss, St Hel., p. 380.

St Helena.—Very common on the shores of the island—*Melliss.*

Very widely spread.

Ulva parvula, Kütz.

Ulva parvula, Kütz., Sp. Alg., p. 474?; Melliss, St Hel., p. 380.

St Helena.—Rare; adhering to *Laurencia cruciata*—*Melliss.*

The original *Ulva parvula* is from the Mediterranean. Dickie does not include this in his enumeration.

Enteromorpha, sp. ?

Enteromorpha, sp.? Dickie in Journ. Linn. Soc. Lond., xiii. p. 181; Melliss, St Hel., p. 380.

St Helena.—Adhering to *Laurencia cruciata*—*Melliss.*

"Structure evidently the same as that of *Enteromorpha percursa*, J. G. Agardh, but too imperfect for identification."—*Dickie.*

SOUTH TRINIDAD.

INTRODUCTORY NOTES.

TRINIDADE, or South Trinidad, as it is designated, for the sake of distinction, in this work, is a rocky, mountainous island of volcanic origin, about three miles in extreme length and less than a mile and a quarter across at its widest part. It is situated in the South Atlantic, in lat. 20° 30′ S. and long. 29° 22′ W., or about 600 miles from the coast of Brazil. A range of hills traverses it lengthwise, and this central ridge slopes gently towards the coast on the northeast side, while on the southwest side a number of spurs jut out from it to the sea, with alternating valleys or plateaus; and the highest point slightly exceeds 2000 feet.

The botany of this solitary island is still very imperfectly known, but it is to be hoped that the day is not far distant when it will be thoroughly investigated, for the little that is known indicates a most interesting flora. Apparently the only botanist who has ever set foot on the island is Sir Joseph D. Hooker. This happened on Sir James Ross's outward voyage to the Antarctic regions, but no stay was made. A party landed in Northwest Bay, where, however, it was impossible to scale the cliffs, and the only botanical results of the trip were two sedges, a grass, and a fern. The inability to reach the interior was particularly disappointing, as tree-ferns and other arboreous vegetation were seen by the aid of a telescope from the ship. From that date (1839) until 1874, when Dr Ralph Copeland made an excursion into the interior of South Trinidad, nothing further seems to have been done towards exploring the island.

Dr Copeland, of the Dunecht Observatory, Aberdeen, was attached to the expedition that went out in the "Venus" to observe the transit of the planet Venus; and he had the good fortune to land at a point whence he could get into the interior. A report of this visit has been published,[1] together with the names of the few plants collected by him. The following notes, while embodying some of our own observations on the plants, is essentially the substance of Dr Copeland's report.

The island was approached from the northwest, where a number of frigate-birds and red geese were encountered, and some were shot. A fine view was obtained of the "Nine-Pin" or "Monument," a basaltic, tower-like rock, about 150 feet in diameter and 820 feet

[1] Abhandlungen des naturwissenschaftlichen Vereines zu Bremen, vii.

high, with quite perpendicular sides. It was a little north of this where Sir James Ross's party landed. According to earlier reports, Dr Copeland states, the summit of this rock was clothed with tall green trees, but they have now disappeared. Tall trees would seem to be rather out of place in such a situation, and we may be excused for doubting the correctness of such a report.

As they sailed along the western side of the island the coast was carefully scanned through a telescope in order to find a landing-place, and a boat was sent exploring for the same purpose; but it was found to be almost impossible to land, and the anchorage was bad. Nevertheless, Dr Copeland and a companion succeeded in getting on some projecting rocks about a third of a mile south of West Point, and after some climbing on this extremely rugged volcanic cliff, they reached the mainland, where they met with innumerable small yellow land-crabs and a tufted sedge. They had hardly landed, however, before they were obliged to take to their boat and return to the ship. All along this side of the island not a single living tree was to be seen in the lower part, though the higher ridges of the hills were covered with a dense forest, which was inhabited by an enormous number of boobies. Many of the trees were palm-like, and probably tree-ferns; but although the "Challenger Instructions" had informed them of the presence of tree-ferns, they were by no means prepared to find them in such abundance and in such development as afterwards turned out to be the case.

The next day the ship rounded the north point, and the whole of the east coast appeared in view. Here naked cliffs overtop the broad green slopes, in striking contrast to the barren shores and wooded summits of the western side. The east coast is divided into three shallow bays, and at first sight looks very favourable for landing; but near, and parallel to, the shore there is a narrow reef, running apparently from end to end. At length a small opening was found in the second bay through which a boat could enter, and where there was no difficulty in landing and drawing the boat up.

The country did not gain on closer inspection, for the green slopes that seemed at a distance to be carpeted with a grassy turf, were completely overgrown by one species of bean, *Canavalia* sp. (probably *Canavalia gladiata*, DC.), whose entangled branches rendered walking very uncomfortable. Moreover, the ground was everywhere burrowed by innumerable land-crabs, the whole country literally swarming with them.

Accompanied by one sailor, Dr Copeland made for the high land of the interior, passing through on his way and examining the ruins of some huts built by a party of Portuguese, who attempted, previously to 1803, to form a settlement there. No traces of cultivated plants were found, but everything was overrun by the *Canavalia* mentioned above. Dr Copeland ascended a ravine formed by a rivulet that flows into the bay below. Large numbers of frigate-birds were found nesting in prostrate dead trees.

It is noteworthy that although most of the valleys on the eastern side of the island contained enormous numbers of dead trees, not a single living one was seen except near

the highest points. Indeed, nearly all the trees were overturned, and had the appearance of having been in that position for many years. Dr Copeland asks whether, as in St Helena, the trees were not destroyed by goats. It may be so; but neither he nor any one from the ship saw a single goat, hog, or cat; yet dense vegetation was encountered in easily accessible localities. In 1803 the American Commodore Amaco Delano visited the island, and found, it is recorded, numerous goats and hogs, as well as cats. Sir James Ross's party saw one goat only in 1839, and left two hens and a cock; but they do not seem to have multiplied, for Dr Copeland saw fowl of no kind.

The wood of the fallen trees is said to resemble mahogany, though of less density.

At an altitude of about 1800 feet, the valley suddenly widens into a kind of plateau, covered for the greater part with a dense thicket of a matted grass [sedge?]. This grass is borne on tough stems one or two inches high, so that the heavy rains that doubtless fall easily run off beneath it.

Contiguous to a small watercourse was a group of tree-ferns, many of them dead, however, though their snake-like trunks were still standing upright; and at some two or three hundred feet higher the vegetation was found to be of quite a different character. Large spaces of ground were clothed with luxuriant ferns, each kind growing in separate patches. These ferns were: *Polypodium lepidopteris*, *Asplenium præmorsum*, and *Asplenium compressum*. The last was less plentiful than the others, but it is the most interesting, inasmuch as it had previously only been found in St Helena. Intermixed with the ferns were clumps of a small shrubby *Composite* plant (*Achyrocline disjuncta*),[1] covered with yellowish-white flower-heads. The summit above, as well as the southwestern slope, was covered with forest, the outskirts of which were very dense, consisting of stunted, almost impenetrable bushes. Looking down into the principal western valley, in which there is a waterfall, a pretty sight met the eye. The valley was nearly filled with tree-ferns, which, seen from above, showed each about eight fronds; and as the trees were all of the same size, with their fronds just meeting each other, the whole formed the most beautiful carpet imaginable. Near the summit a few tree-ferns were associated with the trees forming the bulk of the forest; their trunks were about a foot in girth and from eight to fourteen feet high.

An imperfect specimen of a tree-fern was brought home from here, and it has been described as a new species of *Cyathea*, namely, *Cyathea copelandi*.

Unfortunately Dr Copeland brought away only very fragmentary specimens of a few plants, as night overtook him almost before he could descend to the coast. One thing seems tolerably clear, and that is, the vegetation, luxuriant and abundant though it is in some parts, presents the common characteristics of insular floras, being composed of comparatively few species.

[1] Referred to as *Achyrocline capitata* in Dr Copeland's sketch, from which, however, it is quite distinct, though it resembles that species in general appearance.

Tabular View of all the Vascular Plants at present known from South Trinidad.

Species.	Distribution.
Canavalia gladiata?	Everywhere in the Tropics.
Abatia sp.	The genus restricted to Tropical South America.
Eugenia sp.	A large and widely dispersed genus, abundantly represented in Brazil.
Achyrocline disjuncta	Species endemic. Genus in Africa and America.
Alternanthera paronychioides	Widely dispersed in Tropical America.
Ricinus communis	Now general in warm countries.
Cyperus atlanticus	Species endemic. Genus widely spread.
Fimbristylis nesiotis	" " " "
Sporobolus virginicus	Littoral, and widely dispersed.
Cyathea copelandi	Species endemic. Genus widely spread.
Asplenium furcatum	Widely diffused in warm countries.
Asplenium compressum	Elsewhere only in St Helena.
Polypodium lepidopteris	Common in Tropical America.

The foregoing fragment of the flora of South Trinidad offers little for comment; but assuming it to be an average sample, it indicates a recent origin in comparison with the flora of St Helena. Out of thirteen species, twelve belong to widely-dispersed genera, and the thirteenth to a genus peculiar to South America. All the genera except this one (*Abatia*) are represented on the opposite coast of Africa. Only one genus (*Asplenium*) is represented by more than one species, and four of the species at least are apparently endemic. The presence of *Asplenium compressum* in the island is the most noteworthy fact that Dr Copeland's visit has brought to light. It is to be hoped that the first opportunity will be taken advantage of to thoroughly investigate the natural history of this island. The goats and hogs left on the occasion of Halley's visit in 1700, when the island was taken possession of in the name of the King of England, seem to have multiplied at first, for, as has already been mentioned, Commodore Amaco Delano reports them as being numerous at the beginning of the present century; but they have since died out, probably in consequence of the failure of food. It may be, too, that before they died out they extirpated some of the native plants.

In 1781 a party of English under Commodore Johnstone attempted a settlement in the island, but after two or three months' sojourn they abandoned it as impracticable. A few years later some Portuguese made a similar attempt and failed.

Since the foregoing was put into print, we have had an opportunity of perusing E. F. Knight's "Cruise of the Falcon," in which the author gives a graphic narrative of a perilous and toilsome exploration of the island of South Trinidad, accompanied by his Italian sailor-cook and an English lad of seventeen. Mr Knight is not a naturalist, but being endowed with uncommon powers of observation, and possessing a facile pen and pencil, we are able to glean some definite information from his sparkling book. He and his companions first landed in a cove in South-West Bay, where they ineffectually attempted

to reach the interior of the island, though they climbed the cliffs to a considerable height. Concerning this part, Mr Knight says :—

"What struck us as remarkable was, that though in this cove there was no live vegetation of any kind, there were traces of an abundant extinct vegetation. The mountain slopes were thickly covered with dead wood—wood, too, that had evidently long since been dead; some of these leafless trunks were prostrate, some still stood up as they had grown; many had evidently been trees of considerable size, bigger round than a man's body. They were rotten, brittle, and dry, and made glorious fuel. This wood was close-grained, of a red colour, and much twisted. When we afterwards discovered that over the whole of this extensive island, from the beach up to the summit of the highest mountain —at the bottom and on the slopes of every now barren ravine, on whose loose rolling soil no vegetation could possibly take root—these dead trees were strewed as closely as is possible for trees to grow, and when we further perceived that they all seemed to have died at one and the same time, as if plague-struck, and that not one single live specimen, young or old, was to be found anywhere, our amazement was increased. At one time, Trinidad must have been one magnificent forest, presenting to passing vessels a far different appearance to that it now does. The descriptions given in the Directory allude to these forests; therefore, whatever catastrophe it may have been that killed off all the vegetation of the island, it must have occurred within the memory of man. Looking at the rotten, broken-up condition of the rock, and the nature of the soil, where there is soil—a loose powder, not consolidated like earth, but having the appearance of fallen volcanic ash—I could not help imagining that some great eruption had brought about all this desolation."

Land-crabs, and various kinds of sea-birds, were there in myriads, as indeed in all parts of the island. Afterwards the party landed in another part of South-West Bay, whence they proceeded to the summit of the mountain, encountering at first no living vegetation except a wiry grass, which was succeeded by dwarf ferns, and then on the higher parts they walked through groves of tree-ferns. The north-west coast was only reached after some privations and dangerous climbing, and one night spent amid the horrors of "millions" of land-crabs. From the few words of description given, Mr Knight seems to have met with most of the plants collected by Dr Copeland, and one purslane (*Portulaca*) not seen apparently by the latter. The plant "whose name I know not, spreading far and wide with rope-like creepers, bearing large leaves and pink flowers, and a bean about the size of a haricot," was doubtless the *Canavalia* collected by Dr Copeland; and the shrub-like myrtle on the summit, which Knight "satisfied himself was not the young growth of the species of tree, whose dead specimens were strewn over the whole island," perhaps the same species of *Eugenia*. Beyond the organisms mentioned, there was no life, "not even insect." The ravine by which Knight and his party finally succeeded in reaching the north-east coast was in all probability the same as that ascended by Copeland, for he says it was clear that no other route lay from that side up the mountains. On reaching the coast, they bore southward until they arrived at the most southerly point of the island, where they were obliged to retrace their steps. No other plants were seen; and it is evident that very few species of vascular plants exist on the island, perhaps not half a dozen more than are accounted for in this work.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

LEGUMINOSÆ.

Canavalia sp.

Canavalia sp., *forsan Canavalia gladiata*, DC.; Buchenau in Abhandl. naturwiss. Ver. Bremen, vii. p. 277.

South Trinidad. *Copeland.*

Among other places, the widely dispersed *Canavalia gladiata* inhabits the maritime woods of Brazil.

Dr Buchenau saw only one well-preserved pod.

SAMYDACEÆ.

Abatia sp.

Abatia sp., Buchenau in Abhandl. naturwiss. Ver. Bremen, vii. p. 277.

South Trinidad. *Copeland.*

In the absence of flowers this could not be determined with certainty. The genus *Abatia* is restricted to Tropical South America.

MYRTACEÆ.

Eugenia (Syzygium) sp.

Eugenia (*Syzygium*) sp., Buchenau in Abhandl. naturwiss. Ver. Bremen, vii. p. 277.

South Trinidad.—Summit of the island—*Copeland.*

COMPOSITÆ.

Achyrocline disjuncta, Hemsl.

Achyrocline disjuncta, Hemsl., n. sp.

Achyroclini capitatæ affinis, recedit foliis tenuioribus flaccidis, involucri bracteis atioribus, acheniis nudis, &c. *Herba* humilis, dense ramosa, araneoso-hirsuta. *Folia*

conferta, sessilia, lineari-oblonga, 9–12 lineas longa, vix acuta, tenuia, flaccida, rugulosa, margine recurva. *Capitula* numerosa, in apicibus ramorum confertissima, sessilia, basi indumento araneoso vestita, sæpius 6-flora; involucri bracteæ 12–15, ovato-oblongæ, vix acutæ, flores paullo superantes, omnino scariosæ, glabræ, flavæ. *Flores* minimi, graciles, 2 sæpius ♀ et paullo pinguiores, reliqui ♀; corollæ cylindraceæ; antheræ sagittatæ. *Achenia* oblonga, glabra, nuda; pappi setæ vix scabræ, quam corolla fere duplo longiores.

South Trinidad.—Endemic. Centre of the island, at about 2000 feet; abundant in patches—*Copeland*.

At first sight this looks very much like *Achyrocline capitata*, Baker, from the mountains of Brazil, but a closer comparison proves them to be distinct. *Achyrocline capitata* has much thicker, almost coriaceous leaves, furnished with a short hard mucro; narrower, white involucral bracts and muricate achenes. It appears also to be of a more woody nature than our plant. The small specimen in Kew Herbarium was communicated by Dr Buchenau for determination, and he was informed that it was a species of *Achyrocline* closely allied to *Achyrocline capitata*. In an enumeration (Abhandl. naturwiss. Ver. Bremen, vii. p. 277) of the plants collected by Dr Copeland, Dr Buchenau records it as *Achyrocline capitata*, Baker, with the remark, "Probably only a starved form of this species, but possibly a distinct variety of it, or a very closely allied species." But from Dr Copeland's narrative there is no reason to suppose that the plant was starved or stunted; on the contrary, he states that it grew abundantly and gregariously.

AMARANTACEÆ.

Alternanthera paronychioides, A. St Hil.?

Alternanthera paronychioides, A. St Hil.? Buchenau in Abhandl. naturwiss Ver. Bremen, vii. p. 277.

South Trinidad.—Summit of the island—*Copeland*.

A plant widely dispersed in Tropical America.

EUPHORBIACEÆ.

Ricinus communis, Linn.

Ricinus communis, Linn., Sp. Pl., 1st ed., p. 1007; DC., Prodr., xv. 2, p. 1017.

South Trinidad.—Introduced by man?—*Copeland*.

The castor-oil tree is now found in nearly all warm countries, but it is believed to be indigenous only in the Old World, and most likely only in Tropical Africa.

MONOCOTYLEDONES.

CYPERACEÆ.

Cyperus (Papyrus) atlanticus, Hemsl. (Plate XXIII.)

Cyperus (Papyrus) atlanticus, Hemsl., n. sp.

Cypero ligulari affinis, a quo differt umbellis multo densioribus, spiculis plurifloris, glumis latioribus.

Caules 6–20 poll alti, tenuiculi, obscure trigoni, læves. *Folia* caulem æquantia vel superantia, e basi lata longe attenuata, supra nuda, subtus secus costam leviter scabrida, marginibus scabridis. *Involucri* bracteæ circiter 5, angustæ, inæquales, longiores usque 9–12 poll. longæ. *Umbellæ* 6–12-radiatæ densissimæ, radiis 1–1½ poll. longis. *Spiculæ* planæ, sæpius 5-floræ, numerosæ, confertissimæ, 3–4 lineas longæ. *Glumæ* laxiuscule imbricatæ, glabræ, striatæ, latæ, apice subcucullatæ, margine latiuscule scariosæ, dorso infra apicem mucronulatæ, basi appendiculatæ, appendicibus demum a glumis secedentibus et rhachi persistentibus. *Stylus* trifidus. *Nux* triangularis, minutissime punctata, quam gluma subduplo brevior.

South Trinidad.—Endemic. Dry rocks near the sea—*Hooker*.

Fimbristylis (Oncostylis) nesiotis, Hemsl. (Plate XXIV.)

Fimbristylis (Oncostylis) nesiotis, Hemsl., n. sp.

Oncostylo vestito et *Oncostylo junciformi* affinis, sed omnino glaberrima foliis multo gracilioribus culmo sæpissime longioribus.

South Trinidad.—Endemic—*Hooker*.

This plant, which was collected by Sir J. D. Hooker on the outward voyage of Sir J. Ross's Antarctic Expedition in 1839, is closely allied to the two species named; yet, although easily distinguished by sight, it is difficult to express the differences in words. Ripe nuts are wanting, or a more tangible characteristic of the species might, perhaps, be adduced. There are three sheets of specimens showing the plant in as many different conditions. There is the taller form (fig. A. in our plate), in which the leaves are longer than the culms; and there is the dwarf form (fig. B.) with culms longer than the leaves. Besides these there are two or three tufts bearing new leaves associated with the previous year's culms, which are longer than the leaves; the latter being about a foot long, and the former nearly eighteen inches. There is also one tuft of leaves, the tips of which have been cut off, but which are still fifteen inches long. The flowers of only one head are in good condition, the others having been eaten by insects. The very slender flexible leaves and culms at once distinguish it from the relatively stout, rigid *Oncostylis junciformis;* and the other allied species, *Oncostylis vestita*, is remarkable for its hairiness.

Nevertheless, in consequence of one of the sheets having been erroneously labelled "Trinidad, Lockhart," Grisebach regarded it as West Indian, and named it "*Oncostylis junciformis*," probably without close examination, as he had specimens of the genuine *Oncostylis junciformis* before him at the same time from Trinidad in the West Indies.

GRAMINEÆ.

Sporobolus virginicus, Kunth.

Sporobolus virginicus, Kunth, Gram., i. p. 67, et Enum., i. p. 210.
Sporobolus littoralis, Kunth; Griseb., Fl. Brit. W. Ind.

South Trinidad.—Under the cliff—*Hooker.*

Widely dispersed on tropical and subtropical sea-shores, including many remote islands.

CRYPTOGAMÆ.—VASCULARES.

FILICES.

Cyathea copelandi, Kuhn et Luerssen.

Cyathea copelandi, Kuhn et Luerssen in Abhandl. naturwiss. Ver. Bremen, vii. p. 278.

South Trinidad.—Endemic. Near the summit—*Copeland.*

Asplenium furcatum, Thunb.

Asplenium furcatum, Thunb., Prodr. Fl. Cap., p. 735; Hook., Sp. Fil., iii. p. 165; Luerssen in Abhandl. naturwiss. Ver. Bremen, vii. p. 277.
Asplenium præmorsum, Swartz, Fl. Ind. Occ., iii. p. 1620.

South Trinidad.—Plentiful in patches on the summit—*Copeland.*

Very widely diffused in warm countries.

Luerssen states that the form collected by Dr Copeland is a very large and robust one, such as is rarely found in America, and more like some of the South African specimens in the collections of Breutel and others.

Asplenium compressum, Swartz.

Asplenium compressum, Swartz in Schrad. Journ., 1800, ii. p. 52, et Synop. Fil., pp. 79 et 270; Hook., Fil. Exot., t. 76; Luerssen in Abhandl. naturwiss. Ver. Bremen, vii. p. 278.

South Trinidad. *Copeland.*

Previously only known from the island of St Helena.

Polypodium lepidopteris, Kunze.

Polypodium lepidopteris, Kunze in Linnæa, xiii. p. 132; Hook., Sp. Fil., iv. p. 211; Hook. and Bak., Synop. Fil., p. 346; Luerssen in Abhandl. naturwiss. Ver. Bremen, vii. p. 277.

South Trinidad.—Below the cliff—*Sir Henry Lefroy*; abundant near the summit—*Copeland*.

A very common fern throughout Tropical America; also occurring in the Galapagos.

This is one of the four plants gathered by the small party that landed from the "Erebus" and "Terror" on Sir James Ross's outward voyage to the Antarctic Sea.

CRYPTOGAMÆ.—CELLULARES.

LICHENES.

Ramalinei.

Ramalina anceps, Nyl.

Ramalina anceps, Nyl., Synop. Lich., p. 290; Müll., Arg. in Abhandl. naturwiss. Ver. Bremen, vii. p. 280.

South Trinidad. *Copeland*.

West Indies.

Usneei.

Usnea barbata, var. *rubiginea*.

Usnea barbata, var. *rubiginea*, Meyen et Fest in Nov. Act. Nat. Cur., xix., 4, Suppl., i. p. 200; Müll., Arg. in Abhandl. naturwiss. Ver. Bremen, vii. p. 280.

Usnea florida, *forma rubiginea*, Michx., Fl. Bor. Am., ii. p. 332.

South Trinidad. *Copeland*.

This lichen is one of the most variable and widely diffused.

Parmeliei.

Parmelia latissima, Fée, var. *insidiosa*, Müll. Arg.

Parmelia latissima, Fée, var. *insidiosa*, Müll., Arg. in Lich. Beitr., n. 190, et Abhandl. naturwiss. Ver. Bremen, vii. p. 280.

South Trinidad. *Copeland*.

A new variety of a widely dispersed species.

Pyrenocarpei.

Dichonema sericeum, Mont.

Dichonema sericeum, Mont. in Belang. Voy. aux Indes orientales, Crypt., p. 155, t. 14, fig. 1; Müll., Arg. in Abhandl. naturwiss. Ver. Bremen, vii. p. 280.

South Trinidad.—On trees—*Copeland*.

South America and Polynesia.

THE TRISTAN DA CUNHA GROUP.

INTRODUCTORY NOTES.

Position and Physical Conditions, &c.[1]

The Group consists of three principal islands, named Tristan da Cunha, Inaccessible, and Nightingale, and a few outlying islets. Tristan da Cunha itself is in lat. 37° 2′ 48″ S., and long. 12° 18′ 20″ W. of Greenwich, and the other islands are distant from it respectively about twenty-three and twenty miles to the south-west, Inaccessible Island being nearly equidistant from the other two, and the most westerly of the group, which lies about one-third nearer to South Africa than it does to any part of South America. Like the majority of the islands dealt with in this work, they are of volcanic origin.

Tristan da Cunha is circular in form, has an area of some sixteen square miles, and rises in the centre to an altitude of upwards of 8000 feet above the sea-level. It rises like one mass of rock abruptly from the sea, ascending, according to Carmichael, at an angle of forty-five degrees to the height of 3000 feet; and this mass is surmounted by a dome[2] upwards of 5000 feet high, on the summit of which is the crater of an old extinguished volcano. There is a water-colour drawing of it by Carmichael in the Timber Museum at Kew.

Inaccessible Island is the next in size, being four and a half miles long by about two miles broad, and its greatest altitude is 1840 feet.

Nightingale Island is less than a square mile in area, and its highest peak is 1100 feet.

With regard to the climate of this group, there are no records of any series of observations; but we learn from the accounts of different travellers that on the whole it is very rough and wet, though pleasant enough at certain seasons. Captain Carmichael,[3] who spent four months (November to March) on Tristan da Cunha, gives the following particulars:—

"The climate of Tristan da Cunha is so mild, that the herbage remains unimpaired throughout the year. Snow is never seen on the low land; and the only indication of winter is a transient

[1] Restricted here to the broadest features: further particulars will be found in some of the extracts from Carmichael's and Moseley's descriptions of the vegetation, &c.

[2] This word is borrowed from Carmichael because he so frequently uses it in localising his plants.

[3] *Transactions of the Linnean Society of London*, xii. (1818), p. 491.

sprinkling of hoar-frost, too slight to give any serious check to vegetation. The thermometer during summer rarely ascends beyond 74° in the shade, and stands at about 110° when exposed to the meridian sun. At night it occasionally falls as low as 48° or 50°.

"If we may give credit to the information of a man of the name of Currie, who has lived on the island for the last six years, its climate may be regarded as one of the most rainy in the world. According to his account, the months of January, February, and March are the only period throughout the year in which fair weather may be expected with any degree of certainty. During the other nine months the rain, he told us, is almost perpetual. How far the latter part of this statement may be correct remains still to be proved; but it was our misfortune so far to experience the fallacy of the first, that from the 28th of November, the day on which the detachment landed, to the 30th of March, when I quitted the island, it rained on an average every second day.

"This excessive humidity is not, however, entirely chargeable to the latitude in which the island is situated. Of this we had frequent and tantalising proofs; for, at the very time that the rain poured heaviest down, we could plainly distinguish, from under the skirts of the cloud which hung over, the distant horizon illuminated by the rays of the sun.

"The power which high mountains possess of condensing the moisture of the atmosphere and precipitating it in the form of rain is nowhere, indeed, more apparent or more unremittingly exerted than on this island. The upper region of the mountain is usually involved in a thick cloud, which not only obscures the whole island, but extends its shade to some distance over the surrounding ocean. From this cloud the rain descends in heavy and protracted showers, for the most part on the lower ground only, but occasionally on the summit also. In the latter case its fall is announced by the sudden appearance of torrents of water pouring in a hundred channels over the edge of the precipice, dashing down from cliff to cliff, and forming a series of cascades the most magnificent, perhaps, on the whole face of the globe.

"With such a moist climate and such frequent rains, it is a circumstance worthy of remark, that the island is but scantily supplied with running water. The only permanent stream of any magnitude in the whole island is one which gushes out at the base of the mountain immediately behind the cantonment. Excepting this brook, you meet with nothing from one end of the plain to the other but the dry beds of mountain torrents, which are impetuous, indeed, while they flow, but cease with the shower to which they owe their existence.

"The prevailing winds off Tristan da Cunha blow from the westward and southward. Strong gales are frequent, but rarely continue above twenty-four hours. They never blow quite home on the islands, but incline upwards at some distance from the shore, and striking against the face of the mountain, are beat back on the low land in furious whirlwinds."

Mr Moseley experienced one of these gales, which he describes[1] in the following words:—

"I botanised under the cliffs on the lowland in the morning, and intended to reserve the upper plateau and cliff ascent for the afternoon; but, as I was making my way up the steep slope above the settlement in the afternoon, at about three or four o'clock, suddenly a dark squall came scudding over the sea, and rapidly reaching us, chilled us to the bone. My guide, a small boy, born and bred in the island, crouched down instantly under the tall grass and fern, lying on his side, drawing

[1] Notes by a Naturalist on the Challenger, p. 112.

up his legs, tucking in his head, and screwing himself down into the grass like a hare into her form. We followed his example, and found that the perfection of the shelter to be thus obtained from the scanty herbage was astonishing.

"The squall being felt at the anchorage, up went the recall flag on board the ship, and as soon as the hail ceased, I had to hurry down to the shore, without having ascended the mountain-side for more than five hundred feet."

In another place Mr Moseley says that Tristan da Cunha has a peculiar, cold, barren, uninhabitable appearance, which seems to be characteristic of the islands of the Southern Ocean.

With regard to the representatives of the animal kingdom in the islands that partly or wholly subsist on vegetable productions, formerly there were wild hogs, goats, and rabbits in large numbers on the main island, the descendants of a few individuals placed thereon by various mariners. In 1873, however, according to Moseley, the wild goats and pigs were certainly extinct, and the rabbits nearly, if not quite so. At the time of the visit of the Challenger Expedition, the islanders possessed about 400 or 500 head of cattle, and as many sheep. There were still at that date plenty of pigs, though no more goats in Inaccessible Island.

History of the Botanical Exploration of the Group.

Disregarding a few odd specimens picked up and preserved by various persons who have landed on the main island, we are only aware of the existence of four collections of Tristan da Cunha plants; and of these we have been able to examine and compare three. The first was made by the accomplished and enthusiastic French traveller and botanist, Aubert du Petit-Thouars, in January 1793.[1] This collection we have not seen, but the descriptions and figures of the plants published[2] by Thouars himself are in nearly every instance sufficient for their identification, so that few difficulties have arisen in determining the later collections in accordance with his original names of the plants. Thouars was on his way to the Mascarene Islands, in a small vessel of less than one hundred tons burthen, when the captain found it necessary to put in at Tristan da Cunha for water; and although he had very little time (five days), and was only able to land on the principal island, he not only made a nearly complete collection of the plants of that island, but he also surveyed the others; and in the work of which the title is given below are a map and several views of the three islands. The time actually devoted to botanising is very circumstantially set forth. On the 3d of January, the day of their arrival,

[1] Near the same date of the same year, Sir George Stanton, who was one of the members of Lord Macartney's embassy to China, collected a few plants in Tristan da Cunha, Amsterdam, and St Paul Islands.

[2] Melanges de Botanique et de Voyages. Premier Receuil, Paris, 1811. There are two parts, consecutively paged, entitled respectively, Description Abrégé des Isles de Tristan d'Acugna, and Esquisse de la Flore de l'Isle de Tristan d'Acugna. The latter includes figures of ten of the flowering plants and four of the ferns.

Thouars passed five hours on the island, and collected fifty species of plants. No landing was effected on the 4th, but on the 5th he spent eight hours ashore, and added thirty plants to his previous collection; and on the 6th he landed at nine o'clock in the morning, remaining on the island until ten o'clock of the morrow, in consequence of his having been benighted in an attempt to scale the dome of the mountain. This excursion, though long and up to a great elevation, yielded only twenty new plants. Finally, an hour was spent on the day of departure on another point of the island, where, however, not a single plant was seen that had not been collected before. The summary below of the plants he collected is interesting for comparison with our enumeration of all the plants known from the islands, while affording striking evidence of his activity and industry during the short period he was ashore.

	Orders.	Genera.	Species.	Orders.	Genera.	Species.
Acotyledones	Fungi	4	4	5	23	75
	Algæ	4	21			
	Marchantiæ	3	11			
	Musci	5	23			
	Filices	7	16			
Monocotyledones	Cyperi	3	6	2	5	9
	Gramina	2	3			
Dicotyledones	Polygoneæ	1	1	9	14	16
	Atriplices	1	2			
	Ericæ	1	1			
	Corymbiferæ	3	3			
	Rubiaceæ	1	2			
	Umbelliferæ	2	2			
	Gerania	1	1			
	Rosaceæ	1	1			
	Rhamni	1	1			
	Cultæ	2	2			
	Totals			16	42	100

It has been stated that few difficulties have arisen in identifying Thouars's plants, but an exception should have been made with regard to some of the cellular cryptogams. In the following enumeration his name is cited after each of the species which he is known to have collected, and the citations are complete for the vascular plants. The additions made by subsequent travellers are noted in the succeeding paragraphs. Much more information might be gleaned from Thouars's work; but as Carmichael, by reason of his lengthened stay in the island, had the advantage of fuller knowledge, we prefer quoting him for the condition of the main island at the beginning of the present century; while Moseley must be our authority for its appearance ten years ago, as well as our sole authority for the vegetation of Inaccessible and Nightingale Islands; their natural history not having been investigated prior to the visit of the Challenger.

Captain Carmichael's sojourn in the island was during the last month of 1816 and the first three months of 1817. He and his party appear to be the only persons who have succeeded in reaching the summit of the dome.

What Carmichael has published[1] on the aspects and composition of the vegetation is so well written that we deem it better to extract the more interesting passages than to condense them. They follow here :—

"The face of the mountain, as far up as the base of the dome, is mostly covered with brushwood, intermixed with fern and long grass, which veil its native ruggedness. In many parts, however, it is completely bare, and presents to view the edges of a vast number of strata arranged horizontally, or at slight degrees of inclination. These strata are in general from five to ten feet in thickness, and vary essentially in their internal structure. The greater number are of solid rock, of a bluish-grey colour and extreme hardness, in some instances homogeneous, in others exhibiting crystals of hornblende, felspar, and olivin sparingly scattered, or forming more than a moiety of the compound mass. Between those are frequently interposed beds of scoria cohering from the effect of partial fusion; of tufa studded with crystals of augite; or of ashes condensed by the pressure of the superincumbent mass. The latter, still retaining in a great measure their friable nature, moulder gradually away, and then leave the more compact strata in projecting shelves. Along the north-west side of the island runs a belt of low land about six miles long, varying from a quarter of a mile to a mile in breadth, and presenting to the sea a perpendicular front from fifty to three hundred feet in height. The whole of this plain is a confused assemblage of stony fragments, scoria, and other volcanic products, resting on a bed of lava. . . . The surface, though apparently smooth, and even while clothed with its native herbage, is in fact extremely irregular, being everywhere broken by small ridges of loose stones concealed under a mere scurf of soil. Between those ridges, however, the soil is pretty deep, and consists for the most part of the remains of decayed vegetables, with here and there a substratum of alluvial earth approaching to the nature of clay. . . . This soil has been found admirably adapted for the production of culinary vegetables, but is far too light to support the weight of trees or large shrubs. . . . The northern extremity of the plain is in a great measure cleared of its wood. By setting fire to the grass the trees have been so far scorched as to destroy their vegetation; but they still lie strewed on the ground, and it will cost some labour to remove them. The rest is still in a state of nature, covered with an impenetrable copse.

"The ascent to the peak is practicable in sundry places, but the undertaking is attended with serious difficulties and not free from danger. I went up on the 4th of January, accompanied by Dr Evers, a couple of servants, and a guide, who had been up some days before. We experienced some obstruction at the outset in making our way through the long grass (*Spartina arundinacea*) which grows along the lower part of the mountain in close-entangled tufts. As we advanced, our progress was retarded by the extreme steepness of the ascent and the loose incohesive nature of the rocks, which we could hardly venture to touch, lest these fragments should fall upon our heads; nor did we run less risk in availing ourselves of the arboreous *Phylica* to support our weight, for the greater portion of these being rotten, it was necessary for us to choose with caution, as a mistake

[1] *Transactions of the Linnean Society of London*, xii. (1818) pp. 483–513.

might prove fatal. After a laborious effort of three hours, however, we gained the tableland, and there discovered, to our mortification, that the upper region of the mountain was completely obscured. Urged by a strong west wind, the cloud broke from time to time against the sides of the dome, and gave us a transient glimpse of the peak at a height and distance that were by no means encouraging. After resting for a few minutes, we proceeded across the base of the dome, trusting that the cloud would be dissipated by the meridian sun; nor were we in this respect altogether disappointed. In the meantime, we found the ground, as we advanced, a perfect swamp, studded with tufts of small rushy plants, that gave way under the slightest pressure. Here also we had to pass through extensive patches of *Lomaria robusta* [*Lomaria boryana*], the stems of which, like junks of old cable, trail along the ground, and cross and recross each other in such an intricate manner, that it required all our circumspection to avoid stumbling over them. Further on the ground becomes more firm, but is perforated in all directions by the various species of petrel, which resort in myriads to the island during the season of incubation.

"The surface of the dome is furrowed on every side with ravines, which take their rise among the scoria of the peak, deepen as they descend, and open in tremendous chasms on the edge of the precipice. The various portions of the surface, thus cut off in a great measure from all mutual communication, grow narrower and narrower as you approach the base of the peak, and dwindle at last into bare ridges of scoria, so sharp and so steep that the wild goats of the mountain dare hardly venture to thread them. That ridge in particular, over which we must either have passed or returned without accomplishing our object, is for at least fifty yards not more than twelve inches in diameter. The wind blowing in violent gusts at the time rendered it the more difficult to maintain that strict equilibrium of body the slightest bias from which, either to the one side or the other, would precipitate any of us in an instant to the depth of several hundred feet. We got safely over it, however, though with some trepidation, and in a manner as various, I believe, as the number of the party would admit of.

"A short way beyond this ridge vegetation ceases; not so much owing to the elevation of the ground, as to the total want of any kind of soil wherein plants could fix their roots. From this point to the summit, a distance of about a mile and a half, the whole is a mass of scoria, fragments of cellular lava, and all sorts of volcanic refuse, slipping under your feet, and rendering the toil of ascending excessive. . . . The crater is nearly a mile in circumference: its border is irregular, the south side being two or three hundred feet higher than the north, by which we ascended. At the bottom of it there is a pool of water about 150 yards in diameter, to which the descent by the north side is gradual and easy. . . . I found several mosses on the summit of the peak, and some lichens, among others the *Lichen paschalis*."

Altogether, Carmichael collected fifty-five species of vascular plants, or only sixteen more than Thouars, excluding two, *Lactuca sativa* and *Raphanus sativus*, which the latter found as the remains of cultivation. Indeed, after making certain other necessary reductions, as the exclusion of *Sonchus oleraceus*, on account of its being an introduced plant, and the elimination of two of the species of *Isolepis* (*Scirpus*), in consequence of their being mere varieties of the species collected by Thouars, the total result of four months' observation is an addition of about a dozen species to those collected by Thouars in as many days. On the other hand, Carmichael found and recognised all the vascular plants

enumerated by Thouars, except one, *Phalaris cespitosa*, and this we have been unable to identify with any of the plants in the collections which we have examined, though, according to Thouars, it alone covered large spaces of ground.

The additional plants are—*Ranunculus* sp., *Cardamine propinqua*, *Convolvulus* sp., *Atriplex plebeja*, *Agrostis ramulosa*, *Agrostis media*, *Lycopodium* two species, *Trichomanes angustatum* (*tenerum*), *Pteris incisa*, *Asplenium monanthemum*, *Asplenium medium*, *Polypodium australe*, and *Ophioglossum vulgatum*.

Several of the foregoing plants are noteworthy for different reasons. Thus the *Ranunculus*, which is possibly the Kerguelen *Ranunculus biternata*, and the two endemic species of *Agrostis*, which appear to be most nearly related to our *Agrostis delislei* from Amsterdam Island, afford additional evidence of the common origin of the vegetation of these southern islands. Then there is the *Atriplex* which Carmichael says grows along the shore, and seems to be almost a stranger on the island. This has not been identified with anything else; therefore we are obliged to regard it as endemic, though we strongly suspect it may yet turn out to be an introduced plant. It is in no other collection that has come under our notice. Out of the six additional ferns, one, *Asplenium medium*, is endemic, and a well-marked species.

The next collection in point of date is that made by MacGillivray and Milne, naturalist and assistant naturalist respectively to the expedition of H.M.S. "Herald" to examine the Fiji and other Polynesian Islands, under the command of Captain Denham. This collection was made in November 1852, and consists of about forty species of vascular plants, besides a few undetermined specimens of Musci and Hepaticæ, without fructification. It contains no species that does not occur in other collections, and as nothing has been published concerning it by the collectors themselves, it calls for no further remark in this place.

Lastly, there are the collections of the Challenger Expedition, which, as has already been mentioned, include the plants of all three islands of the group.

These collections were made in October, so that the main island has been botanised by different travellers from October to March; and we may assume that its flora has been fully exhausted, at least as far as the vascular plants are concerned. Without counting the cellular cryptogams, Mr Moseley collected forty-five species of plants, the result of one visit to each island. The collection from the main island was restricted to the irregular strip of land opposite the anchorage, and to the gully immediately above the settlement, which had been explored only to a height of about four hundred feet at the time the recall was hoisted on board the ship, owing to a sudden squall, accompanied by hail. Nevertheless, in the six hours he was ashore, Mr Moseley gathered specimens of thirty-eight vascular plants, though, of course, he missed the more interesting endemic species peculiar to the high land. The numbers for the other islands are—Inaccessible twenty-one, and Nightingale ten species. The special interest of this

collection is that it establishes the fact that the vegetation of the three islands is composed of the self-same species. It embraces, however, one new species, *Cotula moseleyi*, Hemsl., from Nightingale Island, besides a very fine series of *Scirpi*, which constitute the bulk of the short herbage in some parts of the islands. Several of these forms of *Scirpus* are very different in appearance, and Mr Boeckeler, to whom specimens were sent shortly after their arrival in England, has described five of them as new species; but, after carefully studying numerous specimens, we can give that rank to only one. All the principal forms are figured in this work, with the object of showing their close similarity in structure and diversity in habit, which latter is probably due to differences of soil and situation.

Here follow some extracts from Mr Moseley's notes[1] on the vegetation of the three islands :—

"*Tristan da Cunha.*—The cliffs have a scanty covering of green, derived mainly from grasses, sedges, mosses, and ferns, with darker patches of *Phylica nitida*[2] and *Empetrum nigrum*, var. *rubrum*, which become more and more marked towards the summit. Conspicuous patches of bright green are formed under the cliff at the foot of the watercourses by a dock (*Rumex frutescens*). Dotted about amongst the other herbage are rounded tufts of pale bluish green, consisting of *Spartina arundinacea*. On near inspection, the damp foot of the cliffs is found to be covered with mosses and liverworts, which latter form in favourable situations continuous green sheets, covering the earth beneath the grass.

"Unfortunately, specimens in fructification were rare. Two ferns, *Asplenium obtusatum*, growing in the clefts of the rocks, and *Lomaria alpina*, are most abundant under the cliffs. The *Lomaria* plants, where situated on stony slopes and comparatively starved, were all provided with fertile fronds; whilst, when growing in the rich vegetable mould, they were commonly without fructification. The commonest flowering plants under the cliffs are *Apium australe*, *Empetrum*, *Sonchus oleraceus*, *Hypochæris glabra*, and a plant with strongly scented leaves, *Chenopodium tomentosum*, which is used as tea by the inhabitants, a decoction of the leaves being drunk with milk and sugar. The plant also grows abundantly on Inaccessible Island, but only the remains of last season's inflorescence were to be found. *Nertera depressa* is very abundant, creeping everywhere amongst the moss. The yellow-flowered *Oxalis corniculata* was not abundant. *Cardamine hirsuta* was, singularly enough, not met with on either of the three islands of the group, though said by Carmichael to be abundant on the sea-shore.[3] Some shallow fresh-water ponds, close to the sea-beach, were covered with *Confervæ*, but contained no *Chara*. Around these ponds grew a minute sedge (*Scirpus*, sp.) not found on the other two islands of the group.

"In the gully above the settlement, *Phylica nitida*, the only tree in the islands, commences at about 400 feet elevation. There are no trees in this locality, since they have been cut down for

[1] *Journal of the Linnean Society of London*, xiv. pp. 377–384; and Notes by a Naturalist on the Challenger, pp. 108–137.

[2] The nomenclature has been altered in a few instances to bring it into accord with that adopted in this work.

[3] This statement is incorrect, and arose from a misreading of the remarks on the distribution of *Cardamine hirsuta*, in Hooker's Flora Antarctica.

firewood, but there is still plenty of wood on the island, and the trunks of the trees on the upper plateau reach a diameter of 15 inches, as I was told by the inhabitants. The wood supply is not almost exhausted, as is stated in the Cruise of the "Galatea." *Hymenophyllum æruginosum* was found in this gully, and a large specimen of *Lomaria boryana* was picked up, detached, apparently fallen from above. In a deep ditch near one of the cottages are two or three willow bushes, which, in this sheltered situation, are doing well. The water of the streams running down the cliffs opposite the anchorage was found to have a temperature of 50° F., and one of the fresh-water ponds at sea-level a temperature of 54° F. The greater cold of the stream is obviously due to the influence of the snow-water from the peak above.

"The surf throws up a bank of seaweed on the beach; but the heavy waves, dashing on the coarse boulders of which the beach is composed, pound up the algæ to such an extent that a useful specimen is scarcely to be found. The island has a belt of *Macrocystis pyrifera* growing round it. The part between the anchorage and the shore was in about fifteen fathoms.

"*Inaccessible Island.*—On the N.E. side, where the Challenger anchored, the island presents a range of perpendicular cliffs about 1000 feet in height, resembling those of Tristan. Beneath the cliffs is a considerable tract of uneven lower land, composed of *débris* from the cliffs above, and scattered over with fallen rocks. The vegetation of the cliffs is closely similar to that of those of Tristan, but the lower land is covered over its greater part with a dense growth of the tall reed-like *Spartina arundinacea*, which forms a vast penguin rookery. Amidst the sea of grass, on the summits of slight elevations, are patches of *Phylica nitida*. The trees grow thickly together, and their branches meet overhead. The ground beneath them is free from tussock (*Spartina*), and covered with ferns, mosses, and sedges, with *Acæna sanguisorbæ*, and the tea plant (*Chenopodium tomentosum*), in great abundance, the latter here forming a small bush with woody stems. The trunks of the trees are covered with lichens. In a swamp near the penguin rookery a moss was found in abundance, and a sedge (*Carex insularis*), different from those noticed elsewhere, together with *Hydrocotyle capitata*, found also in Tristan, but not obtained in flower.

"Two Germans, one of whom had been a sub-lieutenant in the army in the late war, and who is well educated and highly intelligent, have been living on the island for two years. They gave me much information about the plants. They have cultivated potatoes and cabbages, and several other vegetables, and have introduced two species of clover, which are spreading rapidly. They probably also brought with them to the island a *Convolvulus*, which is very abundant on the cultivated ground near their hut. The ascent to the top of the island is impracticable from the side on which I was landed; and Captain Nares considered it unsafe to land a boat on the north side, where the path to the summit lies. No plants, therefore, were obtained from the higher land. The Germans, however, who frequently spend months together there, say that the plants there are of the same kinds as those below; but, in addition, grow the *Empetrum* of the other islands, *Lomaria boryana*, a *Lycopodium*, said by them to be different from the one found in their company on Nightingale Island, and a small daisy-like flower (*Lagenophora commersonii*). The tussock grass, which spreads up the slopes and straggles up the cliffs to the summit, grows also in large patches on the upper plateau. *Phylica nitida* grows in abundance there also, and *Nertera depressa*, the berries of which are the favourite food of the remarkable endemic thrush of the Tristan group (*Nesocichla eremita*). The berries of *Phylica* are eaten by the bunting (*Emberiza brasiliensis*). On the sea-shore, several species of seaweed grow in considerable quantity, attached to the rocks in shallow

water within the action of the surf. The usual belt of *Macrocystis* ranges along this side of the island.

"*Nightingale Island.*—Tussock grass (*Spartina arundinacea*) covers the whole island with a dense growth, excepting on the summits of the ridges and a few patches here and there on the lower tract, which are occupied by *Phylica nitida*. The tussock here, as at Inaccessible Island, forms an enormous penguin rookery. It was found impossible to reach the highest points of the island, the growth of grass being so thick that it was extremely difficult to penetrate. The plants found on the island were the same as those met with on Inaccessible Island, and grew here under similar conditions. *Lycopodium saururus* was found here, however, on the only high ground attained; and a groundsel-like plant (*Cotula moseleyi*), different from the one so common in Tristan, and not found in Inaccessible Island, was extremely abundant, growing even on unoccupied spots in the rookery. Several plants found in the other islands were not seen here, amongst these *Sonchus oleraceus*. The island has never been inhabited, and is visited only in the sealing time. Two fungi were found on the dead stems of *Phylica nitida*. A large number of these trees had at one spot been prostrated by the wind, and were lying dead. The small outlying islands are covered with tussock, and are rookeries.

"The rocky shelves on the coast frequented by the seals, and leading up to their caves, are coated with a thin layer of a small dark green *Ulva*. The rocks and the algæ were quite dry at the time of our visit, and were some feet above the reach of the ordinary surf. The dried dark green pellicle on the rock had a peculiar shining appearance, almost metallic. Specimens of the rock, with the alga attached, are sent to Kew. There is the usual belt of *Macrocystis pyrifera* here, very dense, and difficult for a boat to push through."

From the foregoing extracts we learn that *Phylica nitida* and *Spartina arundinacea* constitute almost the whole of the conspicuous part of the vegetation of these islands, and it is only on a closer inspection that the other elements become apparent. The *Phylica* often occurs in patches or coppices in the midst of large areas of the grass, the ground beneath being covered with a thick growth of sedges, ferns, and mosses, associated with *Nertera depressa, Acæna sanguisorbæ, Chenopodium tomentosum*, &c.

Mr Moseley is the author of the following particulars of these two plants:—

"In the penguin rookeries the grass, known to the inhabitants of Tristan as 'tussock,' has a habit which appears to be closely similar to that of the Falkland tussock, *Dactylis cæspitosa*, as described by Sir Joseph Hooker in the Flora Antarctica, p. 384. This grass grows to a height of five or six feet, springing in tufts, and forming massive boles or clumps at its base, composed of the contorted bases of the stalks and root-fibres closely matted together. These masses are tough and hard, almost requiring an axe to cut them. The grass thrives best where the ground is saturated with the penguins' dung. The basal masses gradually pass into a peaty, richly manured soil, thus formed, several feet in thickness. The growth of grass is so dense that it is with the utmost labour that a way can be forced through it, except along the penguin roads; and it is so high, that it is only by mounting on an occasional rock, fallen from above, that the direction which has been taken can be made out.

"*Phylica nitida* grows, under the shelter of the cliffs of Inaccessible Island, to a height of twenty feet, or somewhat more. The trunks are never straight, but usually procumbent and again ascending. The largest that I saw was one foot in diameter. On the upper plateau of Inaccessible Island, some trunks are said by the Germans to be eighteen inches in diameter; but the trees there are never so high as they are below, being beaten down by the gales. The wood of the tree is brittle, and, when exposed, rapidly decays; but it is serviceable when dried carefully with the bark on. The Germans use it even for handles to their axes and other tools."

Independently of evidently introduced plants, fifty-five species of vascular plants have been collected in the Tristan da Cunha group. Their distribution is exhibited in the following table:—

Tabular View of the Distribution of the Vascular Plants of the Tristan da Cunha Group.

Names.	Distribution in the Group.			General Distribution.
	Tristan da Cunha.	Nightingale.	Inaccessible.	
Ranunculus sp.	×	...	...	Uncertain.
Cardamine propinqua	×	...	...	Endemic. ?
Pelargonium australe [1]	×	...	×	Australia; New Zealand.
Phylica nitida	×	×	×	Amsterdam and Mascarene Islands, and Madagascar?
Acæna sanguisorbæ	×	×	×	Amsterdam, Australia, New Zealand, and neighbouring islands.
Hydrocotyle capitata	×	...	×	Endemic.
Apium australe	×	...	×	South temperate zone.
Nertera depressa	×	...	×	South temperate zone, and in America northward through the Andes to Mexico.
Nertera assurgens	×	×	×	Endemic.
Lagenophora commersonii	×	...	...	Temperate South America.
Chevreulia stolonifera	×	...	...	Uruguay; Paraguay; Chili.
Gnaphalium pyramidale	×	...	×	Endemic.
Cotula australis	×	...	...	Australia; New Zealand.
Cotula moseleyi	...	×	...	Endemic.
Convolvulus soldanella?	×	...	...	Temperate zones of both hemispheres.
Chenopodium tomentosum	×	×	×	Endemic.
Atriplex plebeja	×	...	...	Endemic. ?
Rumex frutescens	×	...	×	Endemic.
Empetrum nigrum var. rubrum [2]	×	×	×	Widely diffused in north temperate and Arctic regions, and in extra-tropical South America.
Juncus tristanianus	×	...	...	Endemic.
Scirpus sulcatus [3]	×	×	×	Endemic. ?
Scirpus thouarsianus	×	×	×	Endemic.

[1] The variety *acugnaticum* may be peculiar to the group.

[2] The variety *rubrum* is restricted to South America and the Falkland Islands.

[3] These *Scirpi* form the greater part of the green carpet of the islands.

Names.	Distribution in the Group.			General Distribution.
	Tristan da Cunha.	Nightingale.	Inaccessible.	
Scirpus oliveri	...	...	×	Endemic.
Carex insularis	×	...	×	Endemic.
Carex thouarsii	×	×	...	Endemic.
Uncinia brevicaulis	×	...	...	Amsterdam Island.
Spartina arundinacea	×	×	×	Amsterdam and St Paul Islands.
Agrostis ramulosa	×	...	...	Endemic.
Agrostis media	×	...	...	Endemic.
Lycopodium diaphanum	×	...	...	Endemic.
Lycopodium magellanicum	×	...	...	South temperate zone.
Lycopodium saururus	×	×	...	Widely diffused.
Hymenophyllum æruginosum	×	...	...	Endemic.
Trichomanes tenerum	×	...	...	Endemic.
Adiantum æthiopicum	×	...	×	Widely diffused.
Pteris incisa	×	×	×	Widely diffused.
Lomaria alpina	×	...	...	South temperate zone, except South Africa.
Lomaria boryana	×	...	...	West Indies, South America, Tropical and South Africa, Mascarene Islands, and Madagascar.
Blechnum australe	×	...	×	South Africa, St Paul Island, Bourbon, and Madagascar, S. America.
Asplenium obtusatum	×	×	×	South America; Australia; New Zealand; Polynesia.
Asplenium lunulatum	×	×	×	Widely diffused.
Asplenium monanthemum	×	...	...	America; Canaries; Africa.
Asplenium medium	×	...	...	Endemic.
Nephrodium aquilinum	×	×	×	Amsterdam Island (Fournier).
Nephrodium tomentosum	×	...	...	Mascarene Islands and Madagascar.
Aspidium coriaceum[1]	×	...	...	Widely diffused.
Polypodium punctatum	×	...	...	Widely diffused.
Polypodium australe	×	...	...	South temperate zone, except South Africa.
Gymnogramme cheilanthoides	×	...	...	Endemic.
Vittaria stricta[2]	×	×	×	Endemic.
Acrostichum conforme	×	...	...	Generally diffused in warm countries.
Acrostichum hybridum	×	...	...	South America; Africa; Mascarene Islands.
Acrostichum spathulatum	×	...	...	Tropical America, South Africa, Ceylon, and Mascarene Islands.
Acrostichum succisæfolium	×	×	×	Amsterdam Island; Mauritius (Thouars).
Ophioglossum vulgatum	×	...	...	Generally diffused.

The fifty-five species in the foregoing table consist of twenty-nine flowering plants and twenty-six ferns and lycopods: most unusual proportions, and probably not repeated in any other part of the globe. Out of the twenty-nine flowering plants sixteen are endemic: three, *Lagenophora*, *Chevreulia*, and *Empetrum*, are South American, and not

[1] A very small form.

[2] Scarcely specifically different from the widely spread *Vittaria lineata*.

represented eastward of the Tristan da Cunha group, while six extend only in an easterly direction, some of them only as far as Amsterdam and St Paul Islands, others as far as New Zealand and Australia. Two, namely, *Apium australe* and *Nertera depressa*, occur where there is land all round the south temperate zone, and the latter beyond; and the doubtful *Convolvulus* is a widely spread species. Of the twenty-six ferns and lycopods only six are peculiar to the islands; fourteen are African, and sixteen are American; two are all round the south temperate zone, without touching South Africa; and three are restricted to this group, Amsterdam Island, the Mascarenes, and Madagascar. *Blechnum australe* is so near the South American *Blechnum hastatum* in some of its forms as to be indistinguishable, so we can hardly regard this as an African form.

From this partial analysis of the constituents of the flora of Tristan da Cunha, it will be seen that it consists of three or four distinct elements, no one of which sufficiently preponderates to justify the assumption that it is essentially the original flora which has subsequently been enriched by the other elements. It has been suggested that the flora is mainly Fuegian, but the facts before us do not specially support such a view. They indicate rather the former existence of a floral region distinct from the American and Australian, and, if not African, at least more closely allied to that than to any other. Remnants of this flora still exist in St Helena, Tristan da Cunha, Amsterdam Island, and the Mascarene Islands, and in Eastern and Southern Africa. The distribution of *Phylica nitida* and *Spartina arundinacea*, the prevailing plants in Tristan da Cunha, favour this hypothesis; yet there are perhaps equally weighty facts against it. The strongest American affinity, at least to the present flora, is offered by *Empetrum*, which, though abundant in these islands, is not known to occur eastward of them. *Nertera* cannot be regarded as an American type, with an endemic Tristan species, and the other Tristan species ranging all round the south temperate zone; and the remaining species of the genus more numerous in the eastern hemisphere, extending from New Zealand to the Philippine Islands. The presence of *Chevreulia stolonifera* and *Lagenophora commersonii*, both comparatively rare, will hardly establish an American affinity. A majority of the species of the flora of Tristan da Cunha are characteristic of the present general flora of the south temperate zone rather than any particular part of it. But when we have compiled the lists of plants for the islands eastward to Amsterdam, we shall be in a better position for discussing this question. Among introduced plants, more or less established, we have seen specimens of *Cerastium triviale*, *Oxalis corniculata*, *Malva sylvestris*, *Gnaphalium luteo-album*, *Senecio vulgaris*, *Anagallis arvensis*, *Rumex acetosella*, *Poa annua*, *Poa pratensis*, *Festuca myurus*, and *Festuca unioloides*. Mr Moseley mentions, too, that the Germans whom they found on Inaccessible Island had introduced two species of clover, which were rapidly spreading.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

RANUNCULACEÆ.

Ranunculus? Carmich.

Ranunculus? Carmich. in Trans. Linn. Soc. Lond., xii. p. 506.

TRISTAN DA CUNHA.—In a ravine on the tableland—*Carmichael.*

We have examined Carmichael's specimen, which is preserved in the Herbarium of the British Museum, and there can be no doubt that he was correct as to the genus: the species may be *Ranunculus biternatus*, Sm., a Kerguelen Island and South American plant.

CRUCIFERÆ.

Cardamine propinqua, Carmich.

Cardamine propinqua, Carmich. in Trans. Linn. Soc. Lond., xii. p. 507.

TRISTAN DA CUNHA.—Endemic? Ravines on the side of the dome—*Carmichael.*

The only specimen we have seen of this is the original, a very imperfect one, in the Herbarium of the British Museum. It may be referable to *Cardamine hirsuta*, Linn., as limited in Hooker's Handb. Fl. N. Zeal., p. 12.[1]

In the Flora Antarctica, ii. p. 232, this *Cardamine* is reduced to *Cardamine hirsuta*, Linn.; and Grisebach (Vegetation der Erde, ii. p. 635) revives the name *Cardamine antiscorbutica*, Banks and Solander MSS., for it. As already stated, it may be a form of *Cardamine hirusta*, but the specimen is insufficient to decide the question. No one except Carmichael has collected a *Cardamine* in the group; and Mr Moseley specially mentions (Journ. Linn. Soc. Lond., xiv. p. 379) the fact that he did not meet with it in any of the three islands, "though said by Carmichael to be abundant on the sea-shore." The last statement is inaccurate, and was inadvertently made through misreading the remarks in the Flora Antarctica on the general distribution of *Cardamine hirsuta*,

[1] Since this was written, a cultivated specimen of the Tristan da Cunha plant has come to light, and it appears to be the same as *Cardamine flaccida*, Ch. et Schl. See remarks under the same genus, in the account of the botany of Juan Fernandez in Part III. of this work.

Linn., in Fuegia, the Falklands, &c. Carmichael records the plant, as given above, from "ravines on the side of the dome."

CARYOPHYLLEÆ.

Cerastium triviale, Link.

Cerastium triviale, Link., Enum. Pl. Hort. Bot. Berol., i. p. 433.
Cerastium vulgatum, Linn., Sp. Pl., 2d ed., i. p. 627; DC., Prodr., i. p. 415; Benth., Fl. Austr., i. p. 156.

TRISTAN DA CUNHA and INACCESSIBLE ISLAND. *Moseley.*

This very widely dispersed plant was most likely introduced, as neither Thouars nor Carmichael collected it. Mr Bentham, however, expresses the opinion that it is indigenous in Australia and Tasmania.

Polycarpon tetraphyllum, Linn.

Polycarpon tetraphyllum, Linn. f.; DC., Prodr., iii. p. 376; Benth., Fl. Austr., i. p. 163.

TRISTAN DA CUNHA.—Waste gravelly places—*Milne and MacGillivray; Moseley.*

Probably introduced since Carmichael's stay on the island. It is now very widely dispersed in all parts of the globe, except tropical Asia.

GERANIACEÆ.

Pelargonium australe, Willd., var. *acugnaticum.*

Pelargonium australe, Willd.; DC., Prodr., i. p. 654; Benth., Fl. Austr., i. p. 298, var. *acugnaticum*, Benth., l.c., p. 299.
Pelargonium acugnaticum, Thouars, Esquisse Fl. Trist., p. 44, t. 13 (species); Carmich. in Trans. Linn. Soc. Lond., xii. p. 507.

TRISTAN DA CUNHA. *Thouars; Carmichael; Moseley.* INACCESSIBLE ISLAND. *Moseley.*

One of the commoner plants in the lower parts of the islands, or at least in the island of Tristan da Cunha.

It is not possible to say from the specimens before us whether this form deserves specific rank. *Pelargonium australe* is an exceedingly variable species, and some of the small-flowered forms of it from New Zealand are very near *Pelargonium acugnaticum*; yet we have not seen any quite like it. Moseley's specimens are all in a flowerless condition, and Carmichael's, though bearing plenty of flowers, is without ripe fruit. Among other things, the sepals of the Tristan plant are proportionately longer and narrower, and lanceolate-acuminate in shape, and distinctly three-nerved.

Oxalis corniculata, Linn.

Oxalis corniculata, Linn.; DC., Prodr., i. p. 692; Benth., Fl. Austr., i. p. 301; Hook. f., Handb. Fl. N. Zeal., p. 38.

TRISTAN DA CUNHA.—Introduced?—*MacGillivray; Moseley.* INACCESSIBLE ISLAND. *Moseley.*

Oxalis corniculata is almost ubiquitous in temperate and sub-tropical countries, and extends into tropical regions in some places. It is regarded as indigenous in Australia and New Zealand and other southern countries.

RHAMNEÆ.

Phylica nitida, Lamarck. (Plate XXV.)

Phylica nitida, Lamarck, Encycl., ii. p. 77, n. 2613; DC., Prodr., ii. p. 35 (excl. syn. *β eriophora*); Harv. and Sond., Fl. Cap., i. p. 502; Velain in Griseb. Veg. du Globe (Édition Française, Tchihatchef), ii. p. 819.

Phylica arborea, Thouars, Esquisse Fl. Trist., p. 45; Carmich. in Trans. Linn. Soc. Lond., xii. p. 505.

Phylica mauritiana, Boj. in Baker Fl. Maurit., p. 53.

Tristan da Cunha, Inaccessible and Nightingale Islands. *Thouars; Carmichael; Moseley.*

Also in Amsterdam Island, Bourbon, and Mauritius, and perhaps Madagascar.

We agree with Mr Velain, *loc. cit.*, in regarding the Bourbon and Amsterdam Island *Phylicæ* as the same species; and we have no doubt that the Tristan da Cunha plant is likewise the *Phylica nitida* of Lamarck.

Thouars was aware of the close affinity of the Bourbon and Tristan da Cunha species of *Phylica*, for he has the following observation:[1] "Il a beaucoup de rapports avec celui qui croît sur les sommets élevés de Bourbon."

This shrub, or small tree, is polygamously diœcious, and varies considerably in foliage and general appearance at different stages of growth, especially in the Tristan da Cunha group itself. Bourbon specimens which we examined have rather smaller flowers, with shorter calyx lobes; otherwise there is less difference between them and some from Tristan da Cunha than between the specimens from the Tristan da Cunha group alone. We have seen no fruiting specimens either from the Mauritius or Bourbon.

ROSACEÆ.

Acæna sanguisorbæ, Vahl.

Acæna sanguisorbæ, Vahl, Enum., i. p. 294; Benth., Fl. Austr., ii. p. 434; Hook. f., Handb. Fl. N. Zeal., p. 56.

Acæna sarmentosa, Carmich. in Trans. Linn. Soc. Lond., xii. p. 502.

Ancistrum sarmentosum, Thouars, Esquisse Fl. Trist., p. 44.

Tristan da Cunha. *Thouars; Carmichael; Moseley; Milne and MacGillivray.* Inaccessible and Nightingale Islands. *Moseley.*

Also common in south-eastern Australia, Tasmania, New Zealand, the Aucklands, Campbell Island, and Amsterdam Island.

[1] Esquisse Fl. Trist., p. 46.

The genus *Acæna* is diffused all round the south temperate zone, and extends northward through the Andes to Mexico and Southern California: it is also represented in the Sandwich Islands. The species are most numerous in the extreme south of America; and one of these, *Acæna ovalifolia*, Ruiz and Pav., is very closely allied to the present.

UMBELLIFERÆ.

Hydrocotyle capitata, Thouars.

Hydrocotyle capitata, Thouars, Esquisse Fl. Trist., p. 43, t. 12; Carmich. in Trans. Linn. Soc. Lond., xii. p. 506.

TRISTAN DA CUNHA. *Thouars; Carmichael; MacGillivray and Milne; Moseley.* INACCESSIBLE ISLAND. *Moseley.*

Endemic in the group, and a very distinct species when normally developed, as in Carmichael's specimens, and Moseley's from Inaccessible Island, the larger leaves being from two to two and a half inches across; but the starved specimens collected by Milne and MacGillivray have leaves not more than a third of an inch across, and the plant resembles the New Zealand *Hydrocotyle moschata* in appearance. The leaves of Moseley's Tristan da Cunha plant are intermediate in size, the largest being about three quarters of an inch in their greatest diameter. In Carmichael's time, *Hydrocotyle capitata* was very common in the lower part of the main island. Both he and Mr Moseley have placed on record that the plant possesses the uncommon smell and taste of the carrot in a high degree. It is noteworthy that the greatest concentration of species of the widely spread genus *Hydrocotyle* is in the southern hemisphere, there being no fewer than twenty-six in Australia.

Apium australe, Thouars.

Apium australe, Thouars, Esquisse Fl. Trist., p. 43; Carmich. in Trans. Linn. Soc. Lond., xii. p. 506; Benth., Fl. Austr., iii. p. 372; Hook. f., Handb. Fl. N. Zeal., p. 90.

TRISTAN DA CUNHA. *Thouars; Carmichael; MacGillivray and Milne; Moseley.* INACCESSIBLE ISLAND. *Moseley.*

This plant is found all round the southern temperate zone, including many of the remote islets, and South Africa, and it varies very much in size, in the cutting of the leaves, and even in the size and consistence of the fruit. It is very closely allied to the northern celery (*Apium graveolens*), with which it was united in the Flora Antarctica, ii. p. 287, but afterwards separated by the author of the work cited in his Handbook of the Flora of New Zealand, and by Mr Bentham in the Flora Australiensis. This will explain the adoption of the name *Apium graveolens* for the Tristan da Cunha plant by Mr Moseley (Journ. Linn. Soc. Lond., xiv. p. 379), who had only the Flora Antarctica before him when writing the sketch of the vegetation of the islands.

RUBIACEÆ.

Nertera depressa, Gærtn.

Nertera depressa, Gærtn., Fruct. et Sem. Pl., i. p. 124, t. 26; Smith, Ic., ined., ii. t. 28; Bot. Mag., t. 5799; Carmich. in Trans. Linn. Soc. Lond., xii. p. 505; Hook. f., Handb. Fl. N. Zeal., p. 120; Benth., Fl. Austr., iii. p. 431.
Erythrodanum alsineforme, Thouars, Esquisse Fl. Trist., p. 42, t. 10 (*Nertera* in tab.)

Tristan da Cunha.—Everywhere, from the low grounds to the steepest cliffs—*Thouars;* in the most barren spots of the plain—*Carmichael; Moseley.* Inaccessible Island. *Moseley.*

All round the south temperate zone (though hitherto not found in South Africa), and in America, from Fuegia through the Andes to Mexico.

Nertera assurgens, Thouars.

Nertera assurgens, Thouars, Esquisse Fl. Trist., p. 42, t. 11; Carmich. in Trans. Linn. Soc. Lond., xii. p. 505.
Erythrodanum majus, Thouars, *loc. cit.*

Tristan da Cunha. *Thouars; Carmichael.* Inacessible and Nightingale Islands. *Moseley.*

Endemic in the group.

Like the majority of the undoubtedly indigenous plants, this occurs on all the islands of the group. It is very different from *Nertera depressa*, being much larger in all its parts; and it is also distinct from the four or five other species inhabiting Australia, New Zealand, Java, the Philippine Islands, and South America.

COMPOSITÆ.

Lagenophora commersonii, Cass.

Lagenophora commersonii, Cass. in Levrault Dict. Sc. Nat., xxv. p. 110; DC., Prodr., v. p. 307; C. Gay, Fl. Chil., iv. p. 32.
Calendula pusilla, Thouars, Esquisse Fl. Trist., p. 40, t. 9.
Lagenifera magellanica, Cass.; Carmich. in Trans. Linn. Soc. Lond., xii. p. 507.
Calendula magellanica, Willd., Sp. Pl., iii. p. 2344.

Tristan da Cunha.—On the sterile slope of the highest point reached—*Thouars;* on the dome, apparently rare—*Carmichael.*

Common in Chili, and also occurring in Fuegia and the Falkland Islands.

Thouars erroneously cites *Calendula pumila*, Forst. (*Lagenophora forsteri*, DC.), a common New Zealand plant, as a synonym of this.

Chevreulia stolonifera, Cass.

Chevreulia stolonifera, Cass.; DC., Prodr., vii. p. 45; Carmich. in Trans. Linn. Soc. Lond., xii. p. 507.
Xeranthemum cæspitosum, Thouars, Esquisse Fl. Trist., p. 39, t. 8.
Chevreulia thouarsii, Gay, Fl. Chil., iii. p. 332.

Tristan da Cunha.—Sufficiently common—*Thouars;* on the most barren spots of the plain—*Carmichael.*

Uruguay; Paraguay; Chili. Very common in the last-named country.

With this exception, the small genus *Chevreulia*, which may be regarded as *Gnaphalium* with opposite leaves, is restricted to South America, where it extends along the Andes from Chili to Ecuador.

Mr Moseley did not meet with either this or the preceding (*Lagenophora*), certainly indigenous *Compositæ*.

Gnaphalium pyramidale, Thouars. (Plate XXVI.)

Gnaphalium pyramidale, Thouars, Esquisse Fl. Trist., p. 40; Carmich. in Trans. Linn. Soc. Lond., xii. p. 507; DC., Prodr., vi. 234, non Berg.
Gnaphalium thouarsii, Spreng., Syst. Veg., iii. p. 473.

Endemic in the Tristan da Cunha group.

Tristan da Cunha. *Thouars; Carmichael; Moseley.* Inaccessible Island. *Moseley.*

Gnaphalium luteo-album, Linn.

Gnaphalium luteo-album, Linn.; DC., Prodr., vi. p. 230; Benth., Fl. Austr., iii. p. 653; Hook. f., Handb. Fl. N. Zeal., p. 154.

Tristan da Cunha and Inaccessible Island. *Moseley.*

Generally diffused in temperate and tropical regions, and perhaps accidentally conveyed to these islands.

Cotula australis, Hook.

Cotula australis, Hook. f., Fl. N. Zeal., i. p. 128, et Handb. Fl. N Zeal., p. 141; Benth., Fl. Austr., iii. p. 550; Hook. f., Fl. Tasm., t. 50.

Tristan da Cunha.—In pasture—*Milne and MacGillivray.*

Common in Australia and New Zealand, and perhaps also a native of South Africa.

Moseley (Journ. Linn. Soc. Lond., xiv. p. 381) mentions a species of *Cotula*, different from the one described below, as being common in Tristan da Cunha. It was probably this species, but no specimens came to hand.

The genus *Cotula*, although widely diffused in the northern hemisphere, is more specially characteristic of the flora of the south temperate zone, where the species are rather numerous.

Cotula moseleyi, n. sp. (Plate XXVII.)

Glabra, subcarnosa, habitu *Senecionis vulgaris* foliis bipinnatisectis, capitulis breviter pedunculatis, acheniis lævibus.

Herba annua (?) erecta, 5–8 poll. alta, ramosa. *Folia* sessilia, semiamplexicaulia, segmentis angustis acutis. *Capitula* folia vix superantia, 3–4 lineas diametro; involucri bracteæ biseriatæ, ovato-oblongæ, obtusæ vel rotundatæ, margine scariosæ et sublaceratæ; receptaculum concavum, foveolatum. *Flores* dimorphi, pauci exteriores ♀ pedicellati, corollis nullis; interiores sessiles, corollis cylindraceis. *Achenia* compressa, lævia, glabra, marginata.

Nightingale Island.—Endemic. Abundant—*Moseley.*

This species is near *Cotula anthemoides* and *Cotula australis*, differing from the former in its larger flower heads and shorter peduncles, and from the latter in its smooth achenes. It is a more robust plant, with thick, somewhat fleshy stems, like common groundsel.

Hypochæris glabra, Linn.

Hypochæris glabra, Linn.; DC., Prodr., vii. p. 90; Benth., Fl. Austr., iii. p. 677.

Tristan da Cunha.—Introduced? *Moseley.*

This species is now widely dispersed in the southern as well as the northern hemisphere, and it is regarded by Mr Bentham as indigenous in Australia, where it is common without the tropic. Nevertheless, it is almost certainly a recently introduced plant in Tristan da Cunha, for no previous traveller has recorded it from the island.

Sonchus oleraceus, Linn.

Sonchus oleraceus, Linn.; Hook. f., Handb. Fl. N. Zeal., p. 166; Benth., Fl. Austr., iii. p. 679.

Tristan da Cunha.—Introduced? Common on the plain—*Carmichael.* Inaccessible Island. *Moseley.*

The remarks under *Hypochæris glabra* apply equally to this species, which is now almost universally diffused except in the colder regions. Mr Bentham suggests that it may be truly indigenous in Australia; and Sir Joseph Hooker states (Handb. Fl. N. Zeal., p. 166) that his var. β (*Sonchus asper*, Fuchs) is certainly indigenous in New Zealand, having been found by Banks and Solander and Forster, and at Chalky Bay by Lyall, and in the interior of the Northern Island by Colenso, who says that it was formerly eaten by the natives.

CONVOLVULACEÆ.

Convolvulus soldanella ? Linn.

Convolvulus soldanella ? Linn., Sp. Pl., ed. 1, p. 159; Carmich. in Trans. Linn. Soc. Lond., xii. p. 505.

TRISTAN DA CUNHA. *Carmichael.*

This plant is widely spread on the sea-shores in the north and south temperate zones, and is not an unlikely one to have reached the islands. Unfortunately we have not succeeded in finding Carmichael's specimen in the Herbarium of the British Museum, where the first set of his collection is deposited. Carmichael states that he found it on the southeast side of the island growing in the sand close to the shore, and confined to a single spot. He regarded it as of recent introduction, "having in all likelihood been wafted to this shore by the current." It is, however, in none of the subsequent collections; but MacGillivray and Milne collected the almost equally widely dispersed allied species, *Convolvulus sepium*, Linn. (*Calystegia sepium*, R. Br.) in the island of St Paul, in great abundance, about fifty yards from the shore.

Moseley mentions (Journ. Linn. Soc. Lond., xiv. p. 380) that a *Convolvulus* was very abundant on cultivated ground near the huts of some Germans on Inaccessible Island. He assumed that it was introduced by them, and brought away no specimen.

CHENOPODIACEÆ.

Chenopodium tomentosum, Thouars. (Plate XXVIII.)

Chenopodium tomentosum, Thouars, Esquisse Fl. Trist., p. 38; Carmich. in Trans. Linn. Soc. Lond., xii. p. 505; DC., Prodr., xiii. 2, p. 74.
Ambrina tomentosa, Moq., Chenop. Monogr. Enum., p. 37.

TRISTAN DA CUNHA, INACCESSIBLE, and NIGHTINGALE ISLANDS. *Thouars; Carmichael; Milne and MacGillivray; Moseley.* Abundant.

This plant appears to be restricted to the Tristan da Cunha group. Moseley collected it in all three islands. Milne and MacGillivray note on their labels that it was common all over Tristan da Cunha, where it was used as tea; and this use is still kept up.

Atriplex plebeja, Carmich. (Plate XXIX.)

Atriplex plebeja, Carmich. in Trans. Linn. Soc. Lond., xii. p. 508; DC., Prodr., xiii. 2, p. 104.

TRISTAN DA CUNHA.—Endemic? *Carmichael.*

We have only seen the specimen collected by Carmichael, and he states that the plant grew along the shore, and seemed to be almost a stranger in the island. Probably an introduced plant, though we have not succeeded in identifying it. The fruit is unknown.

POLYGONACEÆ.

Rumex frutescens, Thouars. (Plate XXX.)

Rumex frutescens, Thouars, Esquisse Fl. Trist., p. 38; Carmich. in Trans. Linn. Soc. Lond., xii. p. 506; DC., Prodr., xiv. p. 72.

Tristan da Cunha and Inaccessible Island. *Thouars; Carmichael; Moseley.*

Endemic in these islands. Common all along the cliffs.

EMPETRACEÆ.

Empetrum nigrum, Linn., var. *rubrum.*

Empetrum nigrum, Linn., Sp. Pl., ed. 1, p. 1022, var. *rubrum.*

Empetrum rubrum, Vahl in Willd. Sp. Pl., iv. p. 713; Hook. f., Fl. Antarct., ii. p. 345; Gay, Fl. Chil., v. p. 350; Thouars, Esquisse Fl. Trist, p. 39.

Empetrum medium, Carmich. in Trans. Linn. Soc. Lond., xii. p. 508.

Tristan da Cunha, Inaccessible Island, Nightingale Island. *Thouars; Carmichael; Milne and MacGillivray; Moseley.*

South Chili; Fuegia; Falkland Islands.

Whether we regard this as a variety of the northern *Empetrum nigrum* (which is diffused all round the northern part of the temperate zone, as well as the Arctic zone), or as an independent species, its distribution is equally interesting. It is the only undershrub growing gregariously in the Tristan da Cunha group, where it is very abundant and where it finds its eastern limit.

MONOCOTYLEDONES.

JUNCACEÆ.

Juncus tristanianus, Hemsl.

Juncus tristanianus, Hemsl.

Species, ut videtur, *Junco bufonio* valde affinis, differt culmis elongatis filiformibus (aphyllis?) bracteolis minus scariosis, perianthii segmentis inter se æqualibus, seminibus utrinque obtusis, &c.

Tristan da Cunha.—Endemic. Boggy pastures—*MacGillivray.*

The specimens of this rush are very incomplete, but the culm and inflorescence are unlike any other species we have seen of the group to which it belongs. Each flower is subtended by two bracteoles within the bracts, and the long, pointed segments of the perianth are very much like those of *Juncus bufonius*, of which we at first thought it might be an extreme form. There are no leaves, and the portions of the very slender terete culms are about a foot long, with a terminal inflorescence not unlike that of the robust *Juncus bufonius.*

CYPERACEÆ.

Scirpus.

The forms of this genus in Tristan da Cunha and the neighbouring islets, Inaccessible and Nightingale, are numerous, and so closely allied, most of them, to each other, that it is a difficult and perplexing task to deal with them. Nearly a dozen of them have been described as species, or perhaps it would be more correct to say that about that number has been proposed, for some of the forms, doubtless, have been described under more than one name. Of the forms collected by Mr Moseley, Bœckeler described five as new species; only one of which, *Scirpus oliveri*, in our opinion, has any claim to that rank. These sedges are very abundant in the islands, growing in a variety of situations; hence, probably, the differences in habit, vigour, degree of fertility, and other characters which have been regarded as of specific value. We have devoted four plates to the illustration of some of the more distinct forms, which we reduce to four species; and we think it probable that a careful study of all the southern species would lead to the identification of some or all of the insular forms with some of the South African, Australian, or New Zealand species.

Scirpus sulcatus, Thouars. (Plate XXXI.)

Scirpus sulcatus, Thouars, Esquisse Fl. Trist., p. 36, t. 7, fig. dextra; Kunth, Enum., ii. p. 216.
Isolepis sulcata, Carmich. in Trans. Linn. Soc. Lond., xii. p. 503.
Isolepis carmichaelii, Dietr., Sp. Pl., ii. p. 107.
Scirpus thouarsii, Spreng., Syst. Veg. cur. post, p. 27.
Scirpus conspersus, Bœckel. in Linnæa, xxxvi. p. 505, *pro parte?*

Tristan da Cunha Group.—Endemic? *Thouars; Carmichael; MacGillivray; Moseley.*

This is perhaps the same as *Scirpus inundatus*, Spreng., as limited in Bentham's Flora Australiensis, vii. p. 329, and the *Isolepis prolifera*, Hook. f., Fl. Tasm., ii. p. 87, t. 144 (but not of R. Br.), is scarcely distinguishable from our plant.

Scirpus sulcatus, Thouars, var. *moseleyanus*, Hemsl. (Plate XXXII.)

Scirpus sulcatus, Thouars, var. *moseleyanus*, Hemsl.
Scirpus moseleyanus, Bœckeler in Flora, 1875, p. 262 (species).

Nightingale and Inaccessible Islands.—Endemic. *Moseley.*

At first sight this looks very different from typical *Scirpus sulcatus*, but after a careful examination we can come to no other conclusion than that it is a form of the same species. Among the specimens of undoubted *Scirpus sulcatus* from Tristan da Cunha, in Kew Herbarium, is one about four inches high, and the tallest is about twenty-eight inches. Between these extremes there is every gradation; and some of the plants collected by

Milne have culms nearly as slender as those of the present variety, though none is quite so slender. Independently of the extreme slenderness of *Scirpus moseleyanus*, it is also easily recognised by its deep red-brown leaf-sheaths. Whether this character be accidental or not cannot be proved from the one gathering before us, but specimens from both islands exhibit the same character. In one tuft, however, from Nightingale Island, which is proliferous, the colour has either flown or never was so prominent. The very small, sometimes almost obsolete, leaf-blade is much the same in both forms, as are also the glumes, the outer ones being remarkable for the very much thickened keel, which is prolonged into a stout mucro. The analysis of the flowers of the *Isolepis prolifera* of the Flora Tasmanica, ii. t. 144, also offers many points of resemblance; the glumes especially are almost exactly the same, those of our plant having similar red lines as well as the thickened keel. The flowers of *Scirpus moseleyanus*, of the plant figured, which we examined, were either monandrous or diandrous, and we met with one bifid style. This plant was collected in Inaccessible Island. Among the specimens collected in Nightingale Island were some of shorter, stouter growth, bearing more highly developed spikelets, in which nearly all the flowers examined were triandrous. Ripe nuts were not found.

Scirpus thouarsianus, Schult.

Scirpus thouarsianus, Schult. in Rœm. et Schult. Syst. Veg., ii. Mant., p. 84.
Scirpus prolifer, Thouars, Esquisse Fl. Trist., p. 36, t. 7, figura sinistra, non Rottb.
Isolepis prolifera, Carmich. in Trans. Linn. Soc. Lond., xii. p. 503.
Isolepis thouarsii, Dietr., Sp. Pl., ii. p. 109; Kunth, Enum., ii. p. 216.
Scirpus squarrosus, Spreng., Syst. Veg., cur. post., p. 28.
Isolepis acugnana, Schult. in Rœm. et Schult. Syst. Veg., iii. Mant., p. 532.
Isolepis squarrosa, Carmich. in Trans. Linn. Soc. Lond., xii. p. 503.
Scirpus prolifero-ramosus, Bœckeler in Flora, 1875, p. 261.

Tristan da Cunha.—Endemic. *Thouars; Carmichael; Moseley.*

We have not seen Thouars' type, and from his brief description and imperfect figure we cannot determine with certainty what particular form he had in view; but from his remarks on the distribution of the species, we assume that he considered all the forms known to him in the islands, except that which he described as *Scirpus sulcatus*, as one species. His words are: "This plant grows everywhere, in the dryest parts of the mountains, forming a short turf of a beautiful green." His figure agrees best with a small piece of the form which Bœckeler has designated *Scirpus prolifero-ramosus*. This was collected by Mr Moseley, both on the Main Island and on Inaccessible Island.

Scirpus thouarsianus, Schult., var. *bicolor*, Hemsl. (Plate XXXIV. B., figs. 8–16).

Scirpus thouarsianus, Schult., var. *bicolor*, Hemsl.
Scirpus bicolor, Spreng., Syst. Veg., cur. post, p. 28 (species).
Isolepis bicolor, Carmich. in Trans. Linn. Soc. Lond., xii. p. 503; Kunth, Enum., ii. p. 216.

Tristan da Cunha.—Endemic. *Carmichael; Milne and Macgillivray; Moseley.*

This variety, if it even deserve that rank, is dwarf and densely tufted, and the thick glumes are more distinctly two-coloured—green and brown—than in any other; otherwise it presents no tangible differences. A comparison of the analysis of the inflorescence of this with those of the other forms figured, teaches how very closely allied they all are. In all of them the glumes are rather thick, and in some of them, especially the proliferous conditions, they are almost fleshy. The lowermost one is more or less strongly two-ribbed longitudinally. The number of stamens and even stigmas is inconstant in the same spikelet, and therefore of no value whatever for distinguishing the different forms. The floral organs, indeed, seem to be usually in an abnormal condition, owing perhaps to the great tendency to prolification; and the plant seems to propagate itself vegetatively rather than sexually. Among the copious specimens collected by Mr Moseley, as well as those of previous collectors, we have not found one perfect nut. In this variety the number of stamens varies from one to three in the same spikelets, the number usually being less than three. With only two or three of the forms before us, we thought the characters afforded by the leaves would serve to distinguish them; but an examination of the whole series reveals a gradual transition from bladeless sheaths to leaves nearly as long as the culms. In this the relatively broad obtuse blade is longer than the sheath and sometimes as long as the culms. The dwarf, densely tufted specimens in Mr Moseley's collection, which Bœckeler named "*Scirpus bicolor*," and which are as near typical *Scirpus bicolor* as any that we have seen, yet as different from it as some of the so-called species are from each other, have very broad and thick leaves, sometimes longer and sometimes shorter than the culms. All of them, too, exhibit a decided tendency to prolification, though it is never developed in so marked a degree as in some of the other forms. The whole plant, or growths, for some of the culms develop several successive tufts of leaves and branches one above the other, varies from one inch to three or four inches in height, and the inflorescence varies from one or two small spikelets to a very dense globose head composed of very numerous spikelets.

Scirpus thouarsianus, Schult., var. *virens*, Hemsl. (Plate XXXIII., figs. 7–12.)

Scirpus thouarsianus, Schult., var. *virens*, Hemsl.
Scirpus virens, Bœckeler in Flora, 1875, p. 261 (species).

Inaccessible and Nightingale Islands.—Endemic. *Moseley.*

Bœckeler describes the leaves as somewhat acute, the spikelets as 7–3 together and 20–12-flowered, the stamens as two in number, and the nut as exceedingly minute, &c. The plants are six to eight inches high, and slenderer than *Scirpus pallescens*, represented on the same plate in figs. 1–6 as *Scirpus virens;* the leaves are much shorter than the culms, though the blade is longer than the sheath, and rather more obtuse than in figure 7. The culms are, many of them, perhaps half of them, quite barren; others bear one, two, or three, few-flowered spikelets, and the remainder more and larger spikelets up

to the numbers indicated by Bœckeler. This variety is remarkable for the great number of flowers in the larger spikelets, surpassing all the others in this respect. As to the number of stamens, there are sometimes only two, and probably also sometimes only one in the imperfectly developed spikelets; but in the larger spikelets, such as figure 9 represents, we found the number of three to predominate. The nuts we found were imperfect, though not remarkably small. The style was very deeply divided in the flowers examined.

Scirpus thouarsianus, Schult., var. *pallescens*, Hemsl. (Plate XXXIII. A, figs. 1–6.)

Scirpus thouarsianus, Schult., var. *pallescens*, Hemsl.
Scirpus pallescens, Bœckeler in litt., fide D. Oliver in Herb. Kew.

NIGHTINGALE ISLAND.—Endemic. *Moseley.*

Bœckeler does not appear to have published any description of this form, which is remarkable for its coarse almost wholly barren culms. Where there are spikelets, there is always prolification. The blade of the leaf bears about the same proportion to the sheath as it does in *Scirpus virens;* the glumes are somewhat thicker, and the few flowers found were diandrous, with the style scarcely divided to the middle. A comparison of the analyses of the flowers of this and *Scirpus virens* suggests the question;—Does the basal part of the style elongate after the stage represented by figure 11? The filaments certainly do. The small nut is very minutely reticulated, but not so prominently as in fig. 6, whereas that of *Scirpus virens* (fig. 12) appeared to be quite smooth; both were empty and imperfect, and the shapes given in the drawings were taken from single nuts in the condition indicated.

Scirpus oliveri, Bœckeler. (Plate XXXIV. A, figs. 1–7).

Scirpus oliveri, Bœckeler in Flora, 1875, p. 260.

INACCESSIBLE ISLAND.—Endemic. *Moseley.*

This very slender species has strongly keeled glumes, not unlike those of *Scirpus sulcatus;* but it is quite distinct in its long setaceous acute leaves and bracts, &c. Bœckeler describes the flowers as monandrous, while those we examined were triandrous; doubtless the number of stamens varies in this as in the others.

Scirpus sp.

Scirpus aucklandicus, Bœckeler in litt., vix *Isolepis aucklandica*, Hook. f.

TRISTAN DA CUNHA.—Endemic? *Milne and MacGillivray; Moseley.*

The general appearance of this is that of *Scirpus setaceus*, from which, however, it is very distinct. On the other hand, it looks equally distinct from the original *Isolepis aucklandica*, but not being able to study carefully all the southern *Scirpi* of this group, we will not venture to give it a new name.

Carex insularis, Carmich.

Carex insularis, Carmich. in Trans. Linn. Soc. Lond., xii. p. 508; Boott, Carices, iii., p. 111, t. 350.
Carex spicis pluribus masculis femineis pedunculatis, Thouars, Esquisse Fl. Trist., p. 36.

TRISTAN DA CUNHA.—In the plain—*Carmichael.* INACCESSIBLE ISLAND. *Moseley.*

Endemic in the group.

Carex thouarsii, Carmich.

Carex thouarsii, Carmich. in Trans. Linn. Soc. Lond., xii. p. 508; Boott, Carices, iv., p. 176, t. 595.
Carex spicis confertis sessilibus hermaphroditis, Thouars, Esquisse, Fl. Trist., p. 36.

TRISTAN DA CUNHA.—In the plain—*Carmichael; MacGillivray.* NIGHTINGALE ISLAND. *Moseley.*

Endemic in the group.

Uncinia brevicaulis, Thouars, var. *robustior*, Hemsl. (Plate XLV.)

Uncinia brevicaulis, Thouars, Esquisse Fl. Trist., p. 35, t. 6, var. *robustior*, Hemsl.
Uncinia breviculmis, Carmich. in Trans. Linn. Soc. Lond., xii. p. 508.
Uncinia gracilis β, C. B. Clarke in Journ. Linn. Soc. Lond., xx. p. 400.

TRISTAN DA CUNHA. *Thouars; Carmichael.*

Also in St. Paul and Amsterdam Islands.

Mr C. B. Clarke (Journ. Linn. Soc. Lond., xx. p. 400) combines *Uncinia gracilis*, Thouars, with *Uncinia breviculmis*, Carmich. (the name *Uncinia brevicaulis*, Thouars, being omitted) and *Uncinia macloviana*, Gaud., under the name *gracilis*, defining, however, three varieties. We prefer keeping the South American form as a distinct species, because it is easily recognised by its narrower utricles, which considerably overtop the bracts; but Thouars' two species can at the most be regarded as varieties of one. By some oversight Mr Clarke has confused the two forms. He cites Carmichael's *Uncinia breviculmis* under what he regards as typical *Uncinia gracilis;* while his β *gracilis* is evidently a slip, and should have been, according to Thouars' plate, quoted β *brevicaulis*. With regard to the relative length of leaves and culms, Clarke says of his β, "Culmi (in eadem planta) foliis multo breviores aut multo longiores." The specimen in question bears the culms of two seasons, one of the culms belonging the former season being longer than the present leaves; yet in all probability, judging from the other specimens of the species we have seen, the leaves of the same season were longer than the culm. From some cause the growth of the plant was not so vigorous the year the specimen was collected as it had been the year before, hence the disparity in the length of the culms. Carmichael, loc. cit., doubtingly unites Thouars' two species, and states that the culm greatly elongates after flowering. This is so unlikely that we think he likewise may have been deceived by relative length of previous years' culms.

Uncinia brevicaulis, var. *gracilior*, Hemsl. (Plate XLVI.)

Uncinia brevicaulis, var. *gracilior*, Hemsl.
Uncinia gracilis, Thouars, Esquisse Fl. Trist., p. 35, t. 5 (excl. synon.); C. B. Clarke in Journ. Linn. Soc. Lond., xx. p. 400, partim.

TRISTAN DA CUNHA. *MacGillivray and Milne; Thouars.*

This variety has only been collected in Tristan da Cunha, and presents no marked differences beyond greater slenderness.

GRAMINEÆ.[1]

Spartina arundinacea, Carmich. (Plate XXXV.)

Spartina arundinacea, Carmich. in Trans. Linn. Soc. Lond., xii. p. 504; Kunth, Enum., i. p. 279; Reichardt in Verhandl. k. k. zool.-bot. Gesellsch. Wien, xxi. p. 31.
Ponceletia arundinacea, Thouars, Esquisse Fl. Trist., p. 36.

TRISTAN DA CUNHA. *Thouars; Carmichael; MacGillivray and Milne; Moseley.* INACCESSIBLE AND NIGHTINGALE ISLANDS. *Moseley.*

Also in the islands of St Paul and Amsterdam.

This robust reed-like grass constitutes one of the main features of the vegetation of the islands, and grows in such dense thickets as to be almost impenetrable in places.

Agrostis ramulosa, Carmich. (Plate XXXVI.)

Agrostis ramulosa, Carmich. in Trans. Linn. Soc. Lond., xii. p. 504; Steud., Synop. Glum., i. p. 175.
Agrostis carmichaeli, Schultes in Rœm. et Schult. Syst. Veg., ii. Mant., p. 571.
Sporobolus? carmichaeli, Kunth, Gram., i. p. 68, et Enum., i. p. 216.
Vilfa carmichaeli, Steud., Nomencl. Bot.

TRISTAN DA CUNHA.—Endemic. *Carmichael; MacGillivray.*

According to Carmichael, this grass and *Agrostis media* grow on the high part of the mountain, forming the chief part of its herbage. A few straggling tufts were met with on the low ground, along the bottom of the ravines, where the seeds had been washed down by the torrents. It is not in the more recent collections that we have seen.

Although the awn on the flowering glume is reduced to a mere rudiment, this is no justification for removing it from the genus *Agrostis;* moreover, it cannot be regarded as other than a congener of *Agrostis media.*

Agrostis media, Carmich. (Plate XXXVII.)

Agrostis media, Carmich. in Trans. Linn. Soc. Lond., xii. p. 504; Rœm. et Schult., Syst. Veg., ii. Mant., p. 571; Kunth, Enum., i. p. 226.

TRISTAN DA CUNHA.—Endemic. *Carmichael; Milne; Moseley.*

[1] Several introduced grasses have now become common; they are mentioned in the introductory notes preceding this enumeration.

Associated with *Agrostis ramulosa* on the high part of the mountain, where these two grasses formed the chief part of the herbage in Carmichael's time.

These two species of *Agrostis* are very distinct, and are not very closely allied to any others except our *Agrostis delislei* from Amsterdam Island.

Polypogon intermedius, Carmich.

Polypogon intermedius, Carmich. in Trans. Linn. Soc. Lond., xii. p. 504.
Phalaris mollis, Thouars, Esquisse Fl. Trist., p. 37.

TRISTAN DA CUNHA. *Thouars.*

When at the British Museum we omitted looking up Carmichael's specimen; but Mr Ridley has obligingly done so, and he writes: "I have looked at the *Polypogon*, which seems to be of the *Polypogon monspeliensis* section, near *Polypogon napalensis*, but with larger flowers. It is rather a stout plant for a *Polypogon*, and seems to be a distinct species."

Phalaris cespitosa, Thouars.

Phalaris cespitosa, Thouars, Esquisse Fl. Trist., p. 37.

"Panicula pauciflora subspicata, culmo repente stolonifero."

TRISTAN DA CUNHA. *Thouars.*

Thouars's name is not taken up by either Kunth or Steudel, nor does Carmichael include it in his enumeration, and we have no clue to its affinity. The author states that this grass alone sometimes covers large spaces of ground, and to the above brief diagnosis he adds: "Épi long d'un pouce." There is nothing in the collections either of MacGillivray and Milne, or of Moseley, corresponding to this.

CRYPTOGAMÆ.—VASCULARES.

LYCOPODIACEÆ.

Lycopodium diaphanum, Swartz.

Lycopodium diaphanum, Swartz, Synop. Fil., p. 179; Desv., Ann. Soc. Linn. Par., vi. p. 182; Carmich. in Trans. Linn. Soc. Lond., xii. p. 509; Hook. and Grev., Ic. Fil., t. 227; Spring, Monogr. Lycopod., partie 1, p. 93, partie 2, p. 44; Kuhn, Fil. Afr., p. 184.
Lepidotis diaphana, Pal. Beauv. Prodr., p. 108; Thouars, Esquisse Fl. Trist., p. 30.
Lycopodium clavatum, Thouars, Esquisse Fl. Trist., p. 30.

TRISTAN DA CUNHA.—Endemic. *Thouars; Carmichael.*

This species, which is closely allied to *Lycopodium clavatum*, is remarkable for the long tails to the leaves and bracts.

Carmichael states that it grows indiscriminately on the dome, the face of the tableland, and the plain; and that it attains a length of several fathoms. Further he says that the leaves end in a white filament, which gives the plant, in the fresh state, a silky feel.

Lycopodium magellanicum, Swartz.

Lycopodium magellanicum, Swartz, Synop. Fil., p. 180; Desv., Ann. Soc. Linn. Par., vi. p. 184; Spring, Monogr. Lycopod., partie 1, p. 96, partie 2, p. 46; Carmich. in Trans. Linn. Soc. Lond., xii. p. 509; Kuhn, Fil. Afr., p. 185.

TRISTAN DA CUNHA.—On the side of the dome—*Carmichael.*

Common in the cold temperate zone of the southern hemisphere wherever there is land.

In a broad sense this is only a variety of the generally diffused *Lycopodium clavatum*, Linn.

Lycopodium saururus, Lam.[1]

Lycopodium saururus, Lam., Encycl. Bot., iii. p. 653; Swartz, Synop. Fil., p. 176; Spring., Monogr. Lycopod., partie 1, p. 21, et partie 2, p. 6.
Lycopodium insulare, Carmich. in Trans. Linn. Soc. Lond., xii. p. 509.
Lycopodium axillare, Roxb. in Beatson's St Helena Tracts, p. 312.

TRISTAN DA CUNHA.—On the sides of the ravines—*Carmichael.* NIGHTINGALE ISLAND. *Moseley.*

A very widely dispersed species. See the remarks on it in the preceding account of the plants of St Helena (p. 91).

FILICES.

POLYPODIEÆ.

Hymenophyllum æruginosum, Carmich. (Plate XXXVIII.)

Hymenophyllum æruginosum, Carmich. in Linn. Trans. (1818), xii. p. 513; Desv. in Mém. Soc. Linn., Par., 1822–27, p. 332; Hook., Sp. Fil., i. p. 94, excl. var. β et t. 34, A.; Hook. and Bak., Synop. Fil., p. 64; Kuhn,[2] Fil. Afr., p. 38.
Trichomanes æruginosum, Poiret in Lamarck, Encycl., viii. p. 76; Thouars, Esquisse Fl. Trist., p. 34.

TRISTAN DA CUNHA.—Endemic. *Thouars; Carmichael; MacGillivray; Moseley.*

Hymenophyllum æruginosum is most nearly allied to *Hymenophyllum franklinianum*, a New Zealand species, and *Hymenophyllum lanceolatum* and *Hymenophyllum obtusum*, the

[1] Spring referred *Lycopodium insulare*, Carmich., and *Lycopodium axillare*, Roxb., to *Lycopodium selago*, Linn. var. *spinulosum*, Spring; and Kuhn (Fil. Afr., p. 186) follows him; but Baker (MSS. in Herb. Kew) refers them to the present species.

[2] Kuhn (Fil. Afr., p. 38) cites *Trichomanes hirsutum*, Thouars, as a synonym of *Hymenophyllum capillare*, Desv. (*Hymenophyllum lineare*, Swartz), a species not found in the Tristan da Cunha group. It is clear, however, that Thouars had only one species in view, and although he described it as new and named it *Trichomanes æruginosum*, he thought it might be the same as *Trichomanes hirsutum*, Linn., hence he added Linnæus' name and diagnosis with a note of interrogation.

last of which occurs in Amsterdam Island, as well as South Africa, the Sandwich Islands, and New Guinea. Kuhn records it from the Cape of Good Hope ("Hb. Hooker"), but this probably arose from a misreading of Mettenius's notes.

Trichomanes tenerum, Spreng.

Trichomanes tenerum, Spreng., Syst. Veg., iv. p. 129; Hook. and Bak., Synop. Fil., p. 85.
Trichomanes angustatum, Carmich. in Trans. Linn. Soc. Lond., xii. p. 513; Hook., Sp. Fil., i. p. 141; Kuhn, Fil. Afr., p. 32; Hook. and Grev., Ic. Fil., t. 166.

Tristan da Cunha.—On rocks—*Carmichael;* in boggy ground—*MacGillivray and Milne.*

Common in Tropical America, from Mexico to Peru and Brazil. There are copious specimens of this fern in Kew Herbarium from Tristan da Cunha, yet Mr Moseley did not collect it in either of the islands; therefore we presume it must be rare. Kuhn retains the Tristan da Cunha plant as specifically distinct from the American without giving his reasons; but we have followed the Synopsis Filicum, as some of the American specimens are so like the insular ones as to be undistinguishable from them, by external characters at least.

Adiantum æthiopicum, Linn.

Adiantum æthiopicum, Linn., Sp. Pl., ed. 2, p. 1560; Hook., Sp. Fil., ii. p. 37, t. 77, A.; Hook. and Bak., Synop. Fil., p. 123; Kuhn, Fil. Afr., p. 62; Carmich. in Trans. Linn. Soc. Lond., xii. p. 513; Thouars, Esquisse Fl. Trist., p. 34.
Adiantum assimile, Swartz, Synop. Fil., pp. 125 et 322, t. 3, fig. 4.
Adiantum thalictroides, Willd.; Linnæa, x. p. 530; Kuhn, Fil. Afr., p. 66.

Tristan da Cunha.—In ravines, abundant—*Thouars; Carmichael; Moseley.* Inaccessible Island. *Moseley.*

Texas, California, Spain, and South India southward to Chili; Buenos Ayres, Cape of Good Hope, and New Zealand.

Melliss notes (St Helena, p. 351) that it is commonly grown in gardens in St Helena, and becoming wild in some localities.

Pteris incisa, Thunb.

Pteris incisa, Thunb., Prodr. Fl. Cap., p. 733; Hook., Sp. Fil., ii. p. 230; Hook. and Bak., Synop. Fil., p. 172; Kuhn, Fil. Afr., p. 82.
Pteris vespertilionis δ carmichaeliana, Agardh, Rec. Sp. Gen. Pter., p. 80.
Pteris vespertilionis β, R. Br. ex Carmich. in Trans. Linn. Soc. Lond., xii. p. 513.

Tristan da Cunha.—In the wood, not common—*Carmichael;* forming tussocks in a very wet bog—*MacGillivray and Milne.* Inaccessible and Nightingale Islands. *Moseley.*

The species has a very wide range; the variety is peculiar to these islands.

Lomaria alpina, Spreng.

Lomaria alpina, Spreng., Syst. Veg., iv. p. 62; Hook. f., Fl. Antarctica, ii. p. 393, t. 150; Hook., Sp. Fil., iii. p. 16; Hook., Fil. Exot., t. 32; Hook. and Bak., Synop. Fil., p. 178.
Lomaria pennamarina, Mett., ex Kuhn, Fil. Afr., p. 92, et Baker in Mart. Fl. Bras., fasc. xlix. p. 414.
Polypodium pennamarina, Poir. in Lam. Encycl., v. p. 520.
Blechnum pennamarina, Kuhn, Fil. Afr., p. 92.
Lomaria antarctica, Carmich. in Trans. Linn. Soc. Lond., xii. p. 513.
Acrostichum polytrichoides, Thouars, Esquisse Fl. Trist., p. 32, t. 2 (*polypodioides*).

Tristan da Cunha.—On the most barren parts of the plain—*Carmichael;* abundant in pasture land—*MacGillivray and Milne; Moseley.*

The distribution of this fern is very interesting and unusual. It is abundant in Temperate South America, in the Alps of Australia, and in Tasmania; it is one of the characteristic ferns of New Zealand and the neighbouring islands, and it is found in nearly all the other southern islands and islets, from Juan Fernandez round to the Falklands, including Marion Island, the Crozets, Kerguelen, St Paul, and Amsterdam Islands. In the Tristan da Cunha group, however, it has only been found in Tristan da Cunha itself. What is more remarkable in its distribution is its absence from South Africa, especially if the records of its occurrence in South Brazil are trustworthy, but of this there is some doubt. In the Kew Herbarium there are specimens—very vigorous ones—with the fertile fronds nearly two feet long, purporting to have been collected in Brazil by Sello and Glaziou. There are also well-authenticated specimens from Arigue in Valdivia, and in Australia it has been collected as far north as the Macleay river in New South Wales.

Another fact worthy of consideration is the close relationship existing between *Lomaria alpina* and *Lomaria spicant*, which has a similar range of distribution in the northern hemisphere, descending to Syria, Madeira, and the Canaries. A comparison of the forms of the two species reveals such an amount of parallelism and close affinity, that one can arrive at no other conclusion than that they are separated races of a common ancestor.

Lomaria boryana, Willd.

Lomaria boryana, Willd., Sp. Pl., v. p. 292; Hook and Bak., Synop. Fil., p. 180.
Lomaria magellanica, Desv. in Mag. Nat. Berl., 1811, p. 330, et in Mém. Soc. Linn. Par., vi. p. 289; Hook. f., Fl. Antarctica, ii. p. 393; Hook, Sp. Fil., iii. p. 26.
Pteris palmæformis, Thouars, Esquisse Fl. Trist., p. 30.
Lomaria palmæformis, Desv. in Mém. Soc. Linn. Par., vi. p. 290.
Lomaria robusta, Carmich. in Trans. Linn. Soc., xii. p. 512.
Blechnum tabulare, Kuhn, Fil. Afr., p. 94.

Tristan da Cunha. *Thouars; Carmichael; Milne and MacGillivray; Moseley.*

This remarkable fern ranges from the West Indies to the Straits of Magellan and the Falkland Islands, and from Angola to the Cape of Good Hope, occurring also in Bourbon, Mauritius, and Madagascar. The Tristan da Cunha form, which has only been found in

the one island of the group, is very distinct, and deserves the rank of an independent species more than many forms retained as such. It is remarkable for the great substance of its fronds, and for the rhachis being densely clothed throughout with large, chaffy scales, while in the ordinary form it is naked. It is further the most striking member of the order inhabiting the island, being the only one that is arboreous in habit of growth; hence Thouars's specific name of "*palmæformis*." The author named states that the caudex is sometimes two feet high and four inches in diameter; and Carmichael, whose notes are in most instances much too short, writes as follows: "This beautiful fern is more generally scattered than most of the others, being found in all moist places from the tableland down to the plain. The trunk grows to the length of four or five feet, sometimes erect, but usually lying on the ground, with its apex only upright. Though not above two inches in diameter, the stumps of the decayed fronds, with their thick scaly covering attached to it, give it an apparent diameter of eight or nine inches. It is crowned with numerous stiff fronds, from one to three feet in length, according to the age and situation of the plant. The barren fronds form a spreading circle, within which, in the summer, five or six fertile fronds shoot up in a perpendicular tuft."

Blechnum australe, Linn.

Blechnum australe, Linn., Mant., i. p. 130; Swartz, Synop. Fil., p. 114; Hook., Sp. Fil., iii. p. 56; Hook. and Bak., Synop. Fil., p. 186; Carmich. in Trans. Linn. Soc. Lond., xii. p. 512; Thouars, Esquisse Fl. Trist., p. 33; Kuhn, Fil. Afr., p. 91.
Blechnum hastatum, Kaulf. Enum. Fil., p. 161.

Tristan da Cunha.—In ravines—*Carmichael; MacGillivray and Milne; Moseley.*

Inaccessible Island. *Moseley.*

Temperate South America, South Africa, Madagascar, Bourbon, St. Paul, and Ascension?

Asplenium obtusatum, Forst.

Asplenium obtusatum, Forst., Prodr., p. 80; Hook., Sp. Fil., iii. p. 96; Hook., Fil. Exot., t. 46; Hook. and Bak., Synop. Fil., p. 207.
Asplenium obliquum, Forst., l. c.; Schk., Krypt. Gewächse, t. 71; Kuhn, Fil. Afr., p. 109; Carmich. in Trans. Linn. Soc. Lond., xii. p. 512.
Asplenium crassum, Thouars, Esquisse Fl. Trist., p. 33.

Tristan da Cunha.—In the wood—*Carmichael; Moseley.* Nightingale and Inaccessible Islands. *Moseley.*

As limited in Hooker and Baker's Synopsis, this is an exceedingly variable species, including the very different-looking *Asplenium lucidum*, Forst.; and it is very common in Australia, New Zealand, and Polynesia, occurring also in Peru and Chili. The form found in the Tristan da Cunha group is much the same as that represented in Hooker's Filices Exoticæ, t. 46, and the same one has lately been collected in the Crozets by Captain J. N. East.

Asplenium lunulatum, Swartz.

Asplenium lunulatum, Swartz, Synop. Fil., p. 80; Hook. and Bak., Synop. Fil., p. 202.
Asplenium erectum, Bory in Willd. Sp. Pl., v., p. 328; Hook., Sp. Fil., iii. p. 126, t. 178.
Asplenium insulare, Carmich. in Trans. Linn. Soc. Lond., xii. p. 512.
Asplenium marinum, Linn.? Thouars, Esquisse Fl. Trist., p. 34.

TRISTAN DA CUNHA.—In the wood—*Carmichael.* INACCESSIBLE and NIGHTINGALE ISLANDS. *Moseley.*

The form found in these islands of this variable and widely dispersed fern is quite small, having fronds only three to five inches long. For more extended synonymy and distribution, see the enumeration of St Helena plants (p. 95).

Asplenium monanthemum, Linn.

Asplenium monanthemum, Linn., Mant., i. p. 130 (*monanthes*); Murr., Syst. Veg., ii., 2, p. 1302 (*monanthemum*); Forst., Comment. Gœtt. ix. p. 73 (reprint, p. 63); Smith, Ic., ined., t. 73; Hook., Sp. Fil., iii. p. 140; Hook and Bak., Synop. Fil., p. 197; Kuhn, Fil. Afr., p. 107; Carmich. in Trans. Linn. Soc. Lond., xii. p. 512.

TRISTAN DA CUNHA.—In ravines—*Carmichael; Moseley.*

Common in America, from Arizona, Mexico, and West Indies to Chili; in Madeira, the Canaries, and other African islands, including Fernando Po; also in Abyssinia and South Africa.

Asplenium (Athyrium) medium, Hook.

Asplenium (Athyrium) medium, Hook., Sp. Fil., iii. p. 227; Hook. and Bak., Synop. Fil., p. 225; Hook., 2nd Cent. Ferns, t. 43; Kuhn, Fil. Afr., p. 106.
Aspidium medium, Carmich. in Trans. Linn. Soc. Lond., xii. p. 511.
Athyrium medium, Moore, Ind. Fil., ii. p. 96.
Aspidium internubium, Carmich., MSS. in Herb. Kew.

TRISTAN DA CUNHA.—Endemic. On the tableland—*Carmichael.*

A well-marked species, of which we have only seen the specimens collected by Carmichael in 1816.

Asplenium pyramidatum, Desv.

Asplenium pyramidatum, Desv. in Ann. Soc. Linn., vi. p. 271; Mett., Aspl., n. 81, b; Moore, Ind. Fil., p. 159; Hook., Sp. Fil., iii. p. 164; Kuhn, Fil. Afr., p. 114.

TRISTAN DA CUNHA?

This is a doubtful plant of uncertain origin.

Diplazium proliferum, attributed to Thouars by Kuhn (Fil. Afr., p. 112), is a name not mentioned by the former. It is a synonym of *Asplenium decussatum*, Swartz, a species having a wide range, though hitherto not found in South Africa nor in the Tristan da Cunha group.

Nephrodium aquilinum, Hemsl. (Plate XXXIX.)

Nephrodium aquilinum, Hemsl.
Polypodium aquilinum, Thouars, Esquisse Fl. Trist., p. 32; Hook., Sp. Fil., iv. p. 270; Hook. and Baker, Synop. Fil., ed 2., p. 311.
Polypodium acunhianum, Carmich. MSS. in Herb. Kew.
Phegopteris aquilina, Mett. ex Kuhn, Fil. Afr., p. 121.

Tristan da Cunha, Inaccessible and Nightingale Islands. *Thouars; Carmichael; Milne and MacGillivray; Moseley.*

Also in Amsterdam Island, according to Fournier in his account of the ferns collected there by one of the French expeditions.

Nephrodium tomentosum, Desv.

Nephrodium tomentosum, Desv. in. Mém. Soc. Linn. Par., vi. p. 256; Hook. and Bak., Synop. Fil., p. 269.
Polypodium tomentosum, Thouars, Esquisse Fl. Trist., p. 32, t. 3.
Aspidium bifidum, Carmich. in Trans. Linn. Soc. Lond., xii. p. 511.
Nephrodium (Lastrea) conterminum, Desv., β *thouarsianum*, Hook., Sp. Fil., iv. p. 91.
Aspidium riparium, Bory ex Kuhn, Fil. Afr., p. 140.
Aspidium resinosum, Carmich. MSS. in Herb. Kew.

Tristan da Cunha.—Without locality—*Carmichael; Moseley.*

Madagascar; Mauritius; Bourbon.

By an oversight apparently, this species is reduced to *Polypodium aquilinum* in Hooker's Species Filicum. This arose probably from a mistaken identification of a specimen of Carmichael's collecting, and named by him *Polypodium acunhianum*, with *Nephrodium tomentosum*, for we find this name on one of the sheets. Several of Carmichael's ferns bear different manuscript names from those under which they were ultimately published.

Aspidium coriaceum, Swartz.

Aspidium coriaceum, Swartz, Prodr. Fl. Ind. Occ., p. 133, et Synop. Fil., p. 57; Hook., Sp. Fil., iv. p. 32; Lowe, Ferns, vi. p. 36; Kuhn, Fil. Afr., p. 128; Carmich. in Trans. Linn. Soc. Lond., xii. p. 511.
Aspidium capense, Willd., Sp. Pl., v. p. 267; Hook. and Bak., Synop. Fil., p. 254; Lowe, Ferns, vi. t. 40.
Polypodium calyptratum, Thouars, Esquisse Fl. Trist., p. 33.

Tristan da Cunha.—On the face of the tableland—*Carmichael;* without locality—*Moseley.*

Widely spread in Tropical and Temperate South America, in Africa, Mascarene Islands, Polynesia, Australia, and New Zealand.

Carmichael states that he found only one plant, and suggests that it might be a stranger. Moseley collected good specimens; but the fronds bearing sori were only about four inches high, while a specimen collected in Amsterdam Island by De l'Isle is nearly three feet high.

Polypodium punctatum, Thunb.

Polypodium punctatum, Thunb., Fl. Jap., p. 337; Hook. and Bak., Synop. Fil., p. 312 (*β rugulosum*).
Polypodium (Phegopteris) rugulosum, Labill., Fl. Nov. Holl., ii. p. 92, t. 241; Hook., Sp. Fil., iv. p. 272; Roxb. in Beatson's St Helena Tracts, p. 318.
Hypolepis punctata, Mett. ex Kuhn, Fil. Afr., p. 120.
Cheilanthes viscosa, Carmich. in Trans. Linn. Soc. Lond., xii. p. 511.
Polypodium villosoviscidum, Thouars, Esquisse Fl. Trist., p. 33.

Tristan da Cunha.—In the wood, rather common—*Carmichael;* without locality, or other remarks—*Thouars.*

This species, as limited by Hooker and Baker, and by Kuhn, has a very wide area of distribution in South America; in Asia, from Japan southward; in Australia, and in New Zealand, and it is also found in Madagascar, Bourbon, Fernando Po, and St Helena, though hitherto it has not been detected on the continent of Africa.

Polypodium (Grammitis) australe, Mett.

Polypodium (Grammitis) australe, Mett., Polypod., p. 36; Hook., Sp. Fil., iv. p. 166; Hook. and Bak., Synop. Fil., p. 322; Kuhn, Fil. Afr., p. 146.
Grammitis australis, R. Br., Prodr. Fl. Nov. Holl., p. 146; Carmich. in Trans. Linn. Soc. Lond., xii. p. 510; Hook. f., Fl. Antarctica, i. p. iii. and ii. p. 393.
Grammitis magellanica, Desv., Journ. Bot., iii. p. 275.
Asplenium angustifolium, Jacq., Collect., i. p. 121; Ic. Pl. Rar., t. 199.

Tristan da Cunha.—On the tableland and rocky borders of the ravines—*Carmichael.*

Southern extremity of America and the neighbouring islands; Australia, as far north as Queensland; New Zealand, and neighbouring islands; and in Marion Island.

Gymnogramme cheilanthoides, Kaulf.

Gymnogramme cheilanthoides, Kaulf., Enum. Fil., p. 71; Hook., Sp. Fil., v. p. 135; Hook. and Grev., Ic. Fil., t. 24; Kuhn, Fil. Afr., p. 60.
Grammitis cheilanthoides, Swartz, Synop. Fil., pp. 23, 219, et 419; Carmich. in Trans. Linn. Soc. Lond., xii. p. 510.
Asplenium filipendulæfolium, Thouars, Esquisse Fl. Trist., p. 34, t. 4.
Gymnogramme filipendulæfolia, Desv., Journ. Bot., 1813, p. 25.

Tristan da Cunha.—Endemic. High on the face of the tableland, and on a detached hill in the middle of the plain—*Carmichael.*

Of this very distinct fern we have only seen the specimens collected by Carmichael. Swartz erroneously, as it would seem, recorded it as a native of the Mauritius, and he has been copied by most subsequent writers. It must be very rare in Tristan da Cunha, or recent travellers would certainly have collected it, as it is exceedingly elegant, and quite different from anything else in the group.

Vittaria (Tæniopsis) stricta, Carmich.

Vittaria (Tæniopsis) stricta, Carmich. in Trans. Linn. Soc. Lond., xii. p. 513; Hook., Sp. Fil., v. p. 182; Hook. and Bak., Synop. Fil., p. 396.
Pteris vittarioides, Thouars, Esquisse Fl. Trist., p. 31, t. 1.
Vittaria revoluta, Willd. ex Kaulf., Enum. Fil., p. 194; Kuhn, Fil. Afr., p. 56.

Tristan da Cunha.—Endemic. In the wood—*Carmichael.* Inaccessible and Nightingale Islands. *Moseley.*

This should perhaps be united with the widely-spread *Vittaria lineata.*

Acrostichum (Elaphoglossum) conforme, Swartz.

Acrostichum (Elaphoglossum) conforme, Swartz, Synop. Fil., pp. 10 et 192, t. 1, fig. 1; Hook., Sp. Fil., v. p. 198; Hook. and Bak., Synop. Fil., p. 401; Kuhn, Fil. Afr., p. 43; Carmich. in Trans. Linn. Soc. Lond., xii. p. 509.
Acrostichum laurifolium, Thouars, Esquisse Fl. Trist., p. 31.

Tristan da Cunha.—In the wood—*Carmichael; Menzies; Thouars.*

Generally diffused in warm countries.

Acrostichum hybridum, Bory.

Acrostichum hybridum, Bory, Voy., iii. p. 95; Swartz, Synop. Fil., p. 11; Hook., Sp. Fil., v. p. 210; Hook. and Bak., Synop. Fil., p. 403; Kuhn, Fil. Afr., p. 45.
Acrostichum ciliare, Thouars, Esquisse Fl. Trist., p. 328?; Carmich. in Trans. Linn. Soc. Lond., xii. p. 510.

Tristan da Cunha.—On the mouldering banks of the ravines—*Carmichael; Thouars.*

Mexico to Brazil, Tropical and Subtropical South Africa, and Mascarene Islands.

Acrostichum spathulatum, Bory.

Acrostichum spathulatum, Bory, Voy. dans les quatres princ. îles des mers d'Afr., i. p. 363, t. 20, fig. 1; Hook. and Bak., Synop. Fil., p. 408; Kuhn, Fil. Afr., p. 47.
Elaphoglossum spathulatum, Bedd., Ferns S. Ind., p. 71, t. 213.
Acrostichum obtusatum, Carmich. in Trans. Linn. Soc. Lond., xii. p. 510; Kuhn, Fil. Afr., p. 46.
Acrostichum piloselloides, Presl, β *obtusatum*, Hook., Sp. Fil., v. p. 227; Hook., Fil. Exot., t. 29; Hook. and Grev., Ic. Fil., t. 22.

Tristan da Cunha.—On the highest rocks of the tableland—*Carmichael.*

Widely dispersed in Tropical America, also in South Africa, Ceylon, and the Mascarene Islands.

Kuhn retains *Acrostichum obtusatum*, Carmich., as a distinct species, restricted to Tristan da Cunha; but there is no ground for it, and Kuhn most likely never saw Carmichael's specimens, the only ones recorded from the island.

Acrostichum succisæfolium, Thouars.

Acrostichum succisæfolium, Thouars, Esquisse Fl. Trist., p. 30; Carmich. in Trans. Linn. Soc. Lond., xii. p. 510; Hook., Sp. Fil., v. p. 241; Hook. and Grev., Ic. Fil., t. 2; Kuhn, Fil. Afr., p. 48; Hook. and Bak., Synop. Fil., p. 408.
Olfersia succisæfolium, Presl., Tent. Pterid., p. 235.
Elaphoglossum succisæfolium, Moore, Ind. Fil., p. 368.
Acrostichum ciliatum, Desv., Journ. Bot., iii. p. 273.
Acrostichum macropodium, Carmich. MSS. in Herb. Kew.

Tristan da Cunha.—In the wood—*Carmichael*; without note—*MacGillivray and Milne; Moseley.* Inaccessible and Nightingale Islands. *Moseley.*

Thouars records this species from Mauritius, but we have seen no specimen from that island. It is abundant, however, in Amsterdam Island.

OPHIOGLOSSACEÆ.

Ophioglossum vulgatum, Linn.

Ophioglossum vulgatum, Linn., Sp. Pl., ed. 1, p. 1062, var.; Hook. and Bak., Synop. Fil., p. 445.
Ophioglossum opacum, Carmich. in Trans. Linn. Soc. Lond., xii. p. 509; R. Br. ex Kuhn, Fil. Afr., p. 178.
Ophioglossum bulbosum, Baker in Trans. Linn. Soc. Lond., xxvi. p. 344, non Michx.

Tristan da Cunha.—High up on the dome—*Carmichael.*

Taken in the wide sense assigned to it in Hooker and Baker's Synopsis Filicum, this is perhaps the most widely spread of all ferns, both in cold and warm countries; but the form found in Tristan da Cunha and St Helena is a very distinct one in appearance, and if constantly so deserving of specific rank.

Kuhn (l. c. p. 179) records, on the authority of Mettenius, *Ophioglossum reticulatum*, Linn., from Tristan da Cunha; but this seems to have arisen from some error.

CRYPTOGAMÆ.—CELLULARES.

MUSCI.[1]

Physcomitrium (Aphanoregma) brevisetum, Mitt.

Physcomitrium (Aphanoregma) brevisetum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 65.

Inaccessible Island.—Growing on the ground—*Moseley.*

Caulis innovationibus repetitis dichotome ramosus. *Folia* superiora obovato-oblonga, acuta vel brevissime apiculata, nervo infra apicem evanido, margine apicem versus serrulata,

[1] By William Mitten, A.I.S.

cellulis hexagono-oblongis versus folii apicem brevioribus areolata. *Theca* in pedunculo brevi globoso-pyriformis, ore truncato magno, operculo perfecte conico, calyptra longirostris, basi plurifida, laciniis ad operculi basin descendentibus.

Caulis 1–2 c.m. altus. Folia 2–2, 50 mm. longa, satis firma, viridia. Pedunculus 1 mm. parum longior.

Very different from most of the known species of this group by its taller stem, but in other respects not different.

Aphanorhegma serrata, Sullivant, the typical species of the group to which *Physcomitrium brevisetum* belongs, and which it very nearly resembles, so nearly agrees in appearance with *Physcomitrella patens*, that the specimens collected by Drummond were distributed with that name—*Phascum patens*, and it really only differs in the fruit in the same way as *Phascum bryoides* differs from *Pottia*. And although this character—the closed capsule—seems well marked in some species of mosses, there occur species in which the operculum is well defined, and it becomes difficult to know whether it falls off in the usual manner or is persistent.

Besides *Physcomitrium serratum*, there are the *Physcomitrium immersum*, Sull., from the United States, *Physcomitrium pusillum*, Hook. f. et Wils., from New Zealand, *Physcomitrium cyathicarpum*, Mitt., from North-West India, *Physcomitrium cubense*, Mitt., from Cuba, and *Physcomitrium niloticum*, Del., from Egypt, and another South African species collected by Capt. Rooper at East London—*Physcomitrium rooperi: Theca* subglobosa operculo parvo distincte limitato persistente? calyptra ad medium thecæ descendens, folia suprema apiculata apicem versus serrulata. And *Physcomitrium giberti: Physcomitrium immerso*, simillimum sed foliis magis spathulato-oblongis et thecâ a basi lata versus orem angustata calyptrâ operculum planiusculum apiculo parvo tantum obtegente, Uruguay.—M. Gibert. All these species are closely allied to each other in size and mode of growth; they are in Europe represented by *Physcomitrella patens*, which is most usually a very little less in stature; such species are generally supposed to be very short lived. It is certain that *Physcomitrella patens* is able to come to maturity in three or four months in situations covered at other times by water, but it is in some situations more than an annual species.

Ditrichum conicum, Mitt.

Aschistodon conicum, Mont., Ann. Sc. Nat., ser. 3, iv. 109, et Syll. Crypt., p. 42.
Cynontodium conicum, Mitt., Musc. Aust. Am., in Journ. Linn. Soc. Lond., xii. p. 44.
Leptotrichum montagnei, C. Müll., Synop. Musc. Frond., i. p. 448.

Tristan da Cunha. *Moseley.*

Tall stems, barren, but to all appearance the same as specimens from South Chili.

Campylopus introflexus, Mitt.

Campylopus introflexus, Mitt., Musc. Austr. Am. in Journ. Linn. Soc. Lond., xii. p. 84.
Dicranum introflexum, Hedw., Sp. Musc., p. 147, t. 29.

TRISTAN DA CUNHA. *Moseley.*

The fertile specimens are very small and short stemmed; the species is exceedingly variable both in size and colour.

This species abounds throughout the southern hemisphere, and in Europe it extends as far north as the south coast of Britain, and in America as far as Alabama.

Campylopus arcuatus, Mitt.

Campylopus arcuatus, Mitt. in Journ. Linn. Soc. Lond., xv. p. 61.
Dicranum arcuatum, Brid., Bryol. Univ., i. p. 463; C. Müll., Synop. Musc. Frond., i. p. 388.

TRISTAN DA CUNHA.—Barren stems intermixed with a tall state of *Campylopus introflexus*—*Moseley.*

Campylopus vesticaulis, Mitt.

Campylopus vesticaulis, Mitt. in Melliss's St Helena, p. 357.

TRISTAN DA CUNHA.—Endemic. Collected in plenty by MacGillivray and Milne.

It is allied to the preceding, but differs in its leaves.

Ceratodon purpureus, Brid.

Ceratodon purpureus, Brid., Bryol. Univ., i. p. 480; C. Müll., Synop. Musc. Frond., i. p. 646.
Mnium purpureum, Linn., Sp. Pl., 1575.

TRISTAN DA CUNHA.—A few fertile stems growing with *Marchantia polymorpha*. *Moseley.*

A cosmopolitan moss.

Grimmia (Dryptodon) membranacea, Mitt.

Grimmia (Dryptodon) membranacea, Mitt. in Journ. Linn. Soc. Lond., xv. p. 61.

TRISTAN DA CUNHA.—Endemic. On rocks—*Moseley.*

This moss is closely related to the *Grimmia symphyodon*, C. Müller, and although it differs a little in the apices of its leaves, it may be but one form of a widely distributed austral species.

Hymenostylium (Gymnostomum) calcareum, Nees et Hornsch.

Gymnostomum calcareum, Nees et Hornsch., Bry. Germ., i. p. 10.

TRISTAN DA CUNHA.—A few barren stems intermixed with *Bryum megalacrion*. *Moseley.*

It is probably a cosmopolitan species.

Macromitrium acutirameum, Mitt.

Macromitrium acutirameum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 62.

TRISTAN DA CUNHA.—Endemic. A small barren specimen—*Moseley*.

Not nearly related to any known South African species, for from the areolation of its leaves it is probably referable to the section *Goniostoma* in all the described African forms of which the apex of the leaves is not mucronate. It is nearer the New Zealand *Macromitrium aristatum*.

Macromitrium fimbriatum, Schwägr.

Macromitrium fimbriatum, Schwägr., Suppl. ii. 1, p. 37, t. 111; C. Müll., Synop. Musc. Frond., i. p. 739.

TRISTAN DA CUNHA. *Thouars*.

Mauritius?

Philonotis (Bartramia) capillata, Mitt.

Philonotis (Bartramia) capillata, Mitt. in Journ. Linn. Soc. Lond., xv. p. 62.

TRISTAN DA CUNHA.—Endemic. On wet sandy earth—*Moseley*.

The specimens of this moss have young setæ, but the capsules are unformed; in appearance it seems to be similar to the New Zealand *Philonotis tenuis*, Tayl., and it differs from most of the numerous South African species, many of which are only yet known in a barren state, by its narrow long-pointed leaves, which remain in the same position when dry as they are when wet. The stout fruit-stalk seems to indicate its having a capsule of the normal form of *Philonotis*.

Bartramia (Plagiomela) radicosa, Mitt.

Bartramia (Plagiomela) radicosa, Mitt. in Journ. Linn. Soc. Lond., xv. p. 62.

TRISTAN DA CUNHA.—Endemic. Growing on coarse sand in loose tufts—*Moseley*.

Bartramia inconspicua, Mitt.

Bartramia inconspicua, Mitt. in Journ. Linn. Soc. Lond., xv. p. 62.

TRISTAN DA CUNHA.—Endemic. With the preceding—*Moseley*.

Species of this group are numerous in South Africa, but of many the perfect fruit has not been seen, so that it is impossible to assign to them the exact place in the arrangement, which depends on the position and smoothness or plication of the capsule.

Bryum truncorum, Brid.

Bryum truncorum, Brid., Mant. Musc., p. 119; C. Müll., Synop. Musc. Frond., i. p. 254.

TRISTAN DA CUNHA AND INACCESSIBLE ISLANDS. *Moseley.*

South Africa and Mascarene Islands.

Bryum megalacrion, Schwägr.

Bryum megalacrion, Schwägr., Suppl. i. 2, p. 104, t. 71; C. Müll., Synop. Musc. Frond., i. p. 312.

TRISTAN DA CUNHA.—Forming wide patches; specimens bearing only old capsules and in a bad state—*Moseley.*

Mauritius and Rodriguez.

Bryum julaceum, Sm.?

Bryum julaceum, Sm., Fl. Brit., p. 1357? C. Müll., Synop. Musc. Frond., i. p. 315, et. ii. p. 577.

TRISTAN DA CUNHA. *Moseley.*

Some very small barren stems belong to this or some very closely allied species.

Daltonia sp.

TRISTAN DA CUNHA. *Moseley.*

A single fragment proves the existence of a species which cannot be determined.

Stereodon cupressiformis, Brid.

Stereodon cupressiformis, Brid., Bryol. Univ., ii. p. 605; C. Müll., Synop. Musc. Frond., ii. p. 289.
Hypnum cupressiforme, Linn., Sp. Pl., ed 2, p. 1592.

TRISTAN DA CUNHA.—Barren. *Moseley.*

In some form this species appears to be present throughout the world; but it seems to be more abundant in Europe than elsewhere.

Ptychomnion densifolium, Mitt.

Hypnum densifolium, Brid., Sp. Musc., ii. p. 204; C. Müll., Synop. Musc. Frond., ii. p. 442.

TRISTAN DA CUNHA.—Endemic. *Thouars; Moseley.*

As usual, all the specimens are barren; it closely resembles *Ptychomnion aciculare*, but its foliage is more dense and more recurved.

Meiothecium urceolatum, Mitt.

Pterogonium urceolatum, Schwägr., Suppl. ii. 1, p. 33, t. 110.
Neckera urceolata, C. Müll., Synop. Musc. Frond., ii. p. 77.

TRISTAN DA CUNHA.—Endemic. *Thouars.*

Hypnum (Pleuropus) bonplandii, C. Müll.

Hypnum bonplandii, C. Müll., Synop. Musc. Frond., ii. p. 463.
Leskea bonplandii, Hook. in Kunth., Synop. Pl. Æq., i. p. 61, et Musc. Exot., t. 55.

TRISTAN DA CUNHA.—One small barren specimen—*Moseley*.

This moss would appear to be very widely dispersed. Originally described from the Peruvian Andes, it has since been found in South Africa and described as *Hypnum pseudosalebrosum*, Hampe, and *Leucodon sericeus*, Hornsch.; in India, whence Montagne described it as *Isothecium nilgheriense*, and Griffith as *Pleuropus fenestratus*; and the *Hypnum wilkesianum*, Sull., from the Pacific Islands, is probably the same, for specimens have been seen from Hawaii. It is the largest species of the group, to which Schimper applied the name of *Homalothecium*, and, like the *Hypnum sericeum*, according to the circumstances affecting its growth, varies not a little in size and appearance.

Hypnum (Rhynchostegium) raphdiorrhynchum, C. Müll.

Hypnum (Aptychus) raphidorrhynchum, C. Müll., Synop. Musc. Frond., ii. p. 354.

TRISTAN DA CUNHA.—Fragments only—*Moseley*.

South Africa.

Thuidium curvatum, Mitt.

Thuidium curvatum, Mitt. in Melliss's St. Helena, p. 365.

TRISTAN DA CUNHA.—Endemic. Small barren stems—*Moseley*. Originally discovered by MacGillivray and Milne.

Very closely resembling the New Zealand *Thuidium fulvastrum*, and differing chiefly in the shorter cauline leaves, which are more papillose and not plicate.

Fissidens asplenioides, Sw.

Fissidens asplenioides, Sw.; Hedw., Musc. Frond., iii. 65, t. 28; C. Müll., Synop. Musc. Frond., i. p. 69.

TRISTAN DA CUNHA. *Moseley*.

Without fruit, but agreeing with specimens of this species which is found over a vast area. Originally described from the West Indies, it is the *Fissidens flabellatus*, Hornsch., and the *Fissidens stipitatus*, Angstr., from Brazil; the *Fissidens turbinatus*, Taylor, from the Andes, and the species is found also in Australia and in Java as well as in the Atlantic Islands.

Eustichia longirostris, Brid.

Eustichia longirostris, Brid., Bryol. Univ., ii. 674; C. Müll., Synop. Musc. Frond., i. p. 42.
Didymodon distichus, Schwägr., t. 183.
Diplostichum longirostrum, Mont. in Ann. Sc. Nat., ser. 3, iv. p. 116, et Syll. Crypt., p. 67.
Cymbaria jamesoni, Tayl. in Hook. Lond. Journ., vii. p. 190.
Eustichia jamesoni, C. Müll., Synop., ii. p. 523.

TRISTAN DA CUNHA.—Short barren stems intermixed with other terrestrial mosses—*Moseley.*

This curious and elegant moss is now known to grow in South Africa, where it has been gathered by Dr Rehmann, as well as in Madagascar and Chili.

Polytrichum juniperinum, Hedw.

Polytrichum juniperinum, Hedw., Sp. Musc., p. 89, t. 13; C. Müll., Synop. Musc. Frond., i. p. 218.
Polytrichum tristani, Duby, Choix de Mousses exotiques nouvelles ou mal connues in Mém. Soc. Phys. et Hist. Nat. Genève, 1875, t. xxiv.?

TRISTAN DA CUNHA.—Barren stems only—*Moseley.*

Specimens of this cosmopolitan moss were gathered in fruit by Milne. They present no differences from European specimens.

HEPATICÆ.[1]

Plagiochila infuscata, Mitt.

Plagiochila infuscata, Mitt. in Journ. Linn. Soc. Lond., xv. p. 63.

TRISTAN DA CUNHA.—Endemic. On earth or rocks—*Moseley.* Gathered also by Milne in a very slender state.

A small and slender species, with its foliage not shrinking away when dry. In colour and look it would seem to be near to *Plagiochila terebrans*, Nees, Lindenb., t. 20, and *Plagiochila pectinata* (Willd.), Lindenb. t. 2, but from both it differs in its shorter and wider leaves, which in outline come nearer to those of *Plagiochila spinulosa*, having the two apical teeth larger and more distinct.

Jungermannia colorata, Lehm et Lindenb.

Jungermannia colorata, Lehm et Lindenb.; G. L. et N., Synop. Hepat., pp. 86 et 673.

TRISTAN DA CUNHA.—In extensive patches, but all barren—*Moseley.*

Generally diffused in the southern hemisphere.

Lophocolea serrata, Mitt.

Lophocolea serrata, Mitt. in Melliss's St Helena, p. 368, t. 56b, et Journ. Linn. Soc. Lond., xv. p. 64.

TRISTAN DA CUNHA.—Endemic. Creeping amongst *Bryum megalacrion*—*Moseley*; amongst *Fissedens asplenioides*—*Milne.*

[1] By William Mitten, A.L.S.

Lophocolea inconspicua, Mitt.

Lophocolea inconspicua, Mitt. in Journ. Linn. Soc. Lond., xv. p. 64.

TRISTAN DA CUNHA.—Endemic. On the earth amongst mosses, chiefly *Bryum megalacrion—Moseley.*

A very small, dull, olive-brown coloured species; it appears to belong to that group of the *Lophocoleæ* which have bidentate leaves on some portions of their stems, but with the leaves near the perianth entire.

Chiloscyphus lucidus, Mitt.

Chiloscyphus lucidus, Mitt. in Journ. Linn. Soc. Lond., xv. p. 64.

TRISTAN DA CUNHA.—Endemic. Growing on the earth amongst moss—*Moseley.*

This in foliage resembles many species of *Lophocolea* which are generally similar to the European *Lophocolea bidentata*, but its perianth is borne on a lateral branch, and is of small size, its apex subtruncate, and there it is trigonous, below it is terete.

Lepidozia procumbens, Mitt.

Lepidozia procumbens, Mitt. in Melliss's St Helena, p. 369.

TRISTAN DA CUNHA.—Endemic. Only collected by MacGillivray and Milne.

Lejeunia parasitica, Tayl.

Lejeunia parasitica, Tayl. in Hook. Lond. Journ. Bot. 1884, p. 477; G. L. N., Synop. Hepat., p. 377.

TRISTAN DA CUNHA.—In very small quantity creeping on *Grimmia membranacea—Moseley.*

It appears to be the same as the species collected in the Falkland, Lord Auckland, and Campbell Islands.

Pallavicinius procumbens, Mitt.?

Diplolæna procumbens, Tayl.? in Hook. Lond. Journ. Bot. 1845, p. 93; G. L. N., Synop. Hepat., p. 477 (*Blyttia*).

TRISTAN DA CUNHA. *Moseley.*

Barren fronds of this or some very nearly allied species were found creeping amongst *Bryum megalacrion.*

Previously only known from St Helena.

Asterella hemisphærica, Beauv.

Asterella hemisphærica, Beauv. in Dict. Sc. Nat., iii. p. 258; Mitt. in Journ. Linn. Soc. Lond., xv. p. 65.

Reboulia hemisphærica, Raddi; G. L. N., Synop. Hepat., p. 548.

Tristan da Cunha.—Imperfectly fruited specimens—*Moseley*.

A very widely diffused plant.

Marchantia polymorpha, Linn.

Marchantia polymorpha, Linn., Sp. Pl., ed. 2, p. 1603; G. L. N., Synop. Hepat., p. 522; Taylor in Hook. Lond. Journ. Bot., 1844, p. 400.

Tristan da Cunha. *Moseley*.

Almost cosmopolitan.

Anthoceros plicatus, Mitt.

Anthoceros plicatus, Mitt., n. sp., in Journ. Linn. Soc. Lond., xv. p. 65.

Frondes procumbentes, lobati, planiusculi, marginibus incurvis squamulis minutis limbatis; involucrum apice dilatatum, infundibuliforme, fructus brevis, decurvus, plicis longitudinalibus striatus.—*Anthoceros lævis*, Mitt. in Journ. Linn. Soc. Lond., xv. p. 65, non Linn.

Frondes 2–3mm. lati, post exsiccationem atrati. *Fructus* cum involucro 2–3mm. longus.

Tristan da Cunha.—Endemic. Growing on the ground in the same manner as *Anthoceros lævis*—*Moseley*.

The greater portion of the specimen of this species is without fruit, but on a small piece a few rather young fruits have been found. These resemble the similar parts of the genus *Notothylas*, but they show a distinct involucre as usual in *Anthoceros*; the fruit itself is distinctly plicate, but too young to show in what manner it opens, and the spores are not fully formed. The margin of the fronds appears to have the very small scales as if in several rows.

Thouars (Esquisse Fl. Trist., pp. 27–30) enumerates eleven Hepaticæ and twenty-three Musci, most of which are clearly the same as those collected by later travellers, whilst the rest are doubtful. We are not aware that Thouars's collection was ever revised.

LICHENES.

LICHENACEI.

Stereocaulei.

Stereocaulon mixtum, Nyl.

Stereocaulon mixtum, Nyl., Synop. Lich., i. p. 238; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

Tristan da Cunha. *Moseley*.

West Indies; Mexico; New Grenada; Bolivia; Sandwich Islands.

RAMALINEI.

Ramalina yemenensis (Acharius), Nyl.

Ramalina yemenensis (Acharius), Nyl., Monogr. Ramal., p. 46; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

INACCESSIBLE ISLAND. *Moseley.*

Arabia; India; Java; South Africa; South America; Australia; New Zealand.

Ramalina intermedia, Del.

Ramalina intermedia, Del. in Nyl. Monogr. Ramal., p. 68; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

INACCESSIBLE ISLAND. *Moseley.*

Central and Western Europe; North America; Rodriguez.

PARMELIEI.

Parmelia perforata, Acharius.

Parmelia perforata, Acharius, Meth. Lich., p. 217; Nyl., Synop. Lich., i. p. 377; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

TRISTAN DA CUNHA and INACCESSIBLE ISLANDS. *Moseley.*

Western Europe; America; South Africa; Polynesia; Australia.

Parmelia perlata, Acharius.

Parmelia perlata, Acharius, Meth., p. 216; Nyl., Synop. Lich., i. p. 379; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

TRISTAN DA CUNHA. *Moseley.*

Parmelia revolutella, Nyl.

Parmelia revolutella, Nyl. in Journ. Linn. Soc. Lond., xvi. p. 222.

TRISTAN DA CUNHA.—Endemic. On trees? very sparingly seen—*Moseley.*

STICTEI.

Stictina intricata, var. *thouarsii*, Nyl.

Stictina intricata, var. *thouarsii*, Nyl., Synop. Lich., i. p. 335; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

Sticta thouarsii, Del., Stict., n. 25, t. 8, fig. 9; Bory in Duperr., Voy. "Coquille," Bot. Crypt., p. 236.

TRISTAN DA CUNHA. *Thouars; Moseley.*

The species is widely diffused.

LECANOREI.

Lecanora subfusca, var. *granulata*, Nyl.

Lecanora subfusca, var. *granulata*, Nyl., Lich. Antill., p. 11; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

INACCESSIBLE ISLAND.—Apparently common—*Moseley*.

Guadaloupe.

Lecanora (Placopsis) gelida, Linn.

Lecanora (Placopsis) gelida, Linn.; Acharius, Lich. Univ., p. 428; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

TRISTAN DA CUNHA. *Moseley*.

North-West Europe; Greenland; Fuegia; Kerguelen; New Zealand.

Lecanora acunhana, Nyl.

Lecanora acunhana, Nyl. in Journ. Linn. Soc. Lond., xvi. p. 222.

TRISTAN DA CUNHA.—Endemic. On rocks, very sparingly seen—*Moseley*.

"Species bene distincta videtur in stirpe *Lecideæ dispersæ*," Nylander.

Thouars (Esquisse Fl. Trist., p. 26) enumerates sixteen lichens, and his enumeration is repeated here for what it is worth:—

Lichen viridiflavus, Thouars. = *Sticta crocata*, Acharius.
Lichen tenellus, Thouars, n. sp.
Lichen pubescens, Thouars, n. sp.
Lichen xerampelinus, Thouars, n. sp.
Lichen gelatinosus, Thouars. = *Collema*, Acharius.
Lichen sp., Thouars.
Lichen caninus, Linn. = *Peltidea canina*, Acharius.
Lichen centrifugus, Linn. = *Parmelia centrifuga*, Acharius.
Lichen farinaceus, Linn. = *Parmelia farinacea*, Acharius.
Lichen caperatus, Linn. = *Parmelia caperata*, Acharius.
Lichen scyphifer, Linn. = *Bæomyces pyxidatus*, Acharius.
Lichen gracilis, Linn. = *Bæomyces gracilis*, Acharius.
Lichen paschalis, Linn. = *Stereocaulon paschale*, Acharius.
Lichen vulpinus, Linn. = *Parmelia vulpina*, Acharius.
Lichen plicatus, Linn. = *Usnea plicata*, Acharius.
Lichen sp.

FUNGI.

HYMENOMYCETES.

AGARICINI.

Agaricus (Pholiota) phylicigena, Berkl.

Agaricus (Pholiota) phylicigena, Berkl. in Journ. Linn. Soc., xv. p. 52.

Pileo convexo carnoso areolato fulvo, primum lævissimo; stipite crasso sursum

attenuato, deorsum incrassato infra annulum crassum mobilem transversim flocculoso; lamellis leviter decurrentibus argillaceis.

Tristan da Cunha group.—Endemic. On trunks of *Phylica nitida*—*Moseley*.

Pileus three inches or more across, convex, at first very smooth and even, at length repeatedly areolate with a depressed wart on each division, margin turned up; stem excentric, attenuated upwards, thick and swollen below, solid, about two inches high, one and a quarter inch or more thick in the centre; ring thick, very soon detached, and movable; gills moderately broad, crowded, clay-coloured, decurrent, edge pale; spores oblong oblique, about ·0003 inch long, but variable in size.

Very nearly allied to *Agaricus capistratus*, Cooke, but differs in several points, especially in the incrassated stem. There is a misprint in Cooke's description of that species, the figure being quite correct.

ASCOMYCETES.

Pyrenomycetes.

Hypoxylon placentæforme, Berkl. et Curt.

Hypoxylon placentæforme, Berkl. et Curt. in Journ. Linn. Soc. Lond., x. p. 383, et Berkl. in Journ. Linn. Soc. Lond., xv. p. 52.

Tristan da Cunha.—On dead *Phylica*—*Moseley*.

Also in Cuba.

Thouars (Esquisse Fl. Trist., p. 25) enumerates four fungi, namely—*Merulius* sp., "hemispherical, laterally attached to the trunks of trees;" *Agaricus* sp., "a small species laterally attached to the rotten trunks of trees;" *Sphæria* sp. (probably *Hypoxylon placentæforme*); and *Peziza* sp., "orbicular, purplish above, villous beneath."

ALGÆ.

MELANOSPERMEÆ.

Laminariaceæ.

Macrocystis pyrifera, K. A. Agardh.

Macrocystis pyrifera, K. A. Agardh, Sp. Alg., i. p. 47; Kütz., Sp. Alg. p. 582; Dickie in Journ. Linn. Soc. Lond., xiv. p. 384; Harv., Phyc. Austr., t. 202.

Fucus pyrifer, Linn.; Thouars, Esquisse Fl. Trist., p. 25.

Tristan da Cunha. *Thouars; MacGillivray; Moseley.*

All round the Southern Ocean; California, as far south as San Francisco; Unalaschka; Sitcha; China.

The distribution of this gigantic seaweed in the Southern and Pacific Oceans only is noteworthy.

Ectocarpaceæ.

Sphacelaria paniculata, Suhr.

Sphacelaria paniculata, Suhr; J. G. Agardh, Sp. Alg., i. p. 36; Dickie in Journ. Linn. Soc. Lond., xiv. p. 384.

Stypocaulon paniculatum, Kütz., Sp. Alg., p. 467.

Tristan da Cunha. *Moseley.*

Common on the coast of New Zealand and Australia, and also found in Southern Chili.

Rhodospermeæ.

Rhodomelaceæ.

Dasya obscura, Dickie.

Dasya obscura, Dickie, n. sp., in Journ. Linn. Soc. Lond., xiv. p. 384.

Fronde, ramis ramulique densis, subspongiosa, pinnatim ramosa, ramis alternis; rhachi polysiphonia, sursum longius corticata; ramulis densissime dichotomis obtusis; stichidiis lanceolatis breviter pedunculatis.

Tristan da Cunha.—Endemic. *Moseley.*

Only one specimen two to three inches long.

Corallinaceæ.

Arthrocardia corymbosa, J. G. Agardh.

Arthrocardia corymbosa, J. G. Agardh, Sp. Alg., ii. p. 550; Dickie in Journ. Linn. Soc. Lond., xiv. p. 386.

Corallina corymbosa, Lamark in Mém. Mus. Par., ii. p. 234.

Amphiroa corymbosa, Dcne. in Ann. Sc. Nat., sér. 2, xviii. p. 124; Harv., Nereis Austr., p. 99, t. 38; Kütz., Sp. Alg., p. 703.

Inaccessible Island. *Moseley.*

Cape of Good Hope; New Zealand.

Kützing, loc. cit., by mistake, probably, cites "ad oras Americæ" for this species.

Sphærococcoideæ.

Nitophyllum undulatum, Kütz.

Nitophyllum undulatum, Kütz.; Dickie in Journ. Linn. Soc. Lond., xiv. p. 385.

Tristan da Cunha. *Moseley.*

Cape of Good Hope.

Mr Moseley's specimens are not in very good condition, and they are very dwarfed, yet they have both coccidia and tetraspores, and seem to belong to the species mentioned.

Rhodymeniaceæ.

Plocamium coccineum, Kütz.

Plocamium coccineum, Kütz., Phyc. Gener., p. 442, t. 64, et Sp. Alg., p. 883; Dickie in Journ. Linn. Soc. Lond., xiv. p. 385.
Fucus plocamium, Gmel.; Thouars, Esquisse Fl. Trist., p. 26.

Tristan da Cunha. *Moseley; Thouars.*

Generally diffused in both north and south temperate and subtropical regions.

Cryptonemiaceæ.

Gymnogongrus capensis, J. G. Agardh.

Gymnogongrus capensis, J. G. Agardh, Sp. Alg., iii. p. 213; Dickie in Journ. Linn. Soc. Lond., xiv. p. 386.
Chondrus complicatus, Kütz., Tab. Phyc., xvii., t. 58.

Tristan da Cunha and Inaccessible Islands. *Moseley.*

Cape of Good Hope; Mauritius.

Callophyllis discigera, Kütz.

Callophyllis discigera, Kütz., Sp. Alg., p. 745; Dickie in Journ. Linn. Soc. Lond., xiv. p. 385.
Rhodomenia discigera, J. G. Agardh, Symb., i. p. 15.

Tristan da Cunha. *Moseley.*

Cape of Good Hope.

Gigartina radula, Esp.

Gigartina radula, Esp., Icon., t. 113; J. G. Agardh, Sp. Alg., iii. p. 202; Dickie in Journ. Linn. Soc. Lond., xiv. p. 386.

Tristan da Cunha and Inaccessible Island. *Moseley.*

The extreme south of America; Falkland Islands; Cape of Good Hope; Kerguelen Island.

Iridæa capensis, J. G. Agardh.

Iridæa capensis, J. G. Agardh, Sp. Alg., iii. p. 180; Dickie in Journ. Linn. Soc. Lond., xiv. p. 385.

Tristan da Cunha. *Moseley.*

Cape of Good Hope; Kerguelen Island.

Epymenia obtusa, Kütz.

Epymenia obtusa, Kütz., Sp. Alg., p. 787; Dickie in Journ. Linn. Soc. Lond., xiv. p. 385.

Tristan da Cunha. *Moseley.*

Marion Island; Aucklands; New Zealand; Cape Horn; Cape of Good Hope.

CERAMIACEÆ.

Microcladia moseleyi, Dickie.

Microcladia moseleyi, Dickie in Journ. Linn. Soc. Lond., xiv. p. 385.

Fronde sursum compressa, cæspitosa, parce dichotoma, apicibus obtusis incurvis; sphærosporis irregulariter dispositis.

TRISTAN DA CUNHA.—Endemic. *Moseley.*

"There are already four known species of this peculiar genus, viz.:—*Microcladia glandulosa*, found in South Britain, France, Spain, and the Mediterranean; *Microcladia coulteri*, Harv., from California; *Microcladia borealis*, Rupr., found at Nootka, Fort Vancouver, Unalaschka, and Golden Gate, California; and Kützing has described *Microcladia tenuis*, from the Gaboon, Guinea. This new species, which I have named after the discoverer, seems in general habit to be nearest to the British, but differs in being more simple in the form of the terminal ramuli and distribution of the tetraspores; the transverse section also shows a greater number of large cells surrounding the central tube."—*Dickie.*

Centroceras clavulatum, J. G. Agardh.

Centroceras clavulatum, J. G. Agardh, Sp. Alg., ii. p. 148; Dickie in Journ. Linn. Soc. Lond., xiv. p. 386.

TRISTAN DA CUNHA. *Moseley.*

Widely distributed in both hemispheres.

Centroceras oxyacanthum, Kütz.

Centroceras oxyacanthum, Kütz., Phyc. Gener., p. 742, et Sp. Alg., p. 689; Dickie in Journ. Linn. Soc. Lond., xiv. p. 386.

TRISTAN DA CUNHA and INACCESSIBLE ISLAND. *Moseley.*

West Indies; Cape of Good Hope.

CHLOROSPERMEÆ.

ULVACEÆ.

Porphyra laciniata, K. A. Agardh.

Porphyra laciniata, K. A. Agardh; Kütz., Sp. Alg., p. 692; Dickie in Journ. Linn. Soc. Lond., xiv. p. 386.

Ulva umbilicalis, Linn.; Thouars, Esquisse Fl. Trist., p. 25.

TRISTAN DA CUNHA. *Moseley; Thouars.*

Widely spread.

Porphyra vulgaris, K. A. Agardh.

Porphyra vulgaris, K. A. Agardh; Kütz., Sp. Alg., p. 692; Dickie in Journ. Linn. Soc. Lond., xiv. p. 386.

Tristan da Cunha. *Moseley.*

Widely spread.

Confervaceæ.

Cladophora hospita, Kütz.

Cladophora hospita, Kütz., Phyc. Gener., p. 271, et Sp. Alg., p. 388; Dickie in Journ. Linn. Soc. Lond., xiv. pp. 386 et 387.

Tristan da Cunha and Inaccessible Islands. *Moseley.*

South Africa, common; St Paul Island.

Thouars further enumerates *Conferva scoparia*, Linn. = *Sphacelaria scoparia*, Lyngb., and *Fucus palmatus*, Linn. = *Nitophyllum stipitatum*, Suhr. (*Sphærococcus palmatus*, Kütz.), making nine species altogether. He also states that he accidentally lost his main collection, which he believed to contain some undescribed species, when returning to the ship through a rough sea.

PRINCE EDWARD GROUP.

MARION ISLAND.

INTRODUCTORY NOTES.

For what is known of the natural history of this group, we are wholly indebted to the Challenger Expedition. The vegetation of these islands, the Crozets, Kerguelen, and Heard Islands, is essentially the same; therefore it would be superfluous to analyse the composition of their individual floras. Instead of this, a tabular view of the vascular plants of all the islands is given in the Report on the Botany of Heard Island—the last of the series (p. 244).[1] With the exception of *Hymenophyllum tunbridgense, β wilsoni*, and *Aspidium mohrioides* in Marion Island, and *Asplenium obtusatum* in the Crozets, all the vascular plants, at least, that have been collected in Marion, the Crozets, and Heard Islands, occur also in Kerguelen Island. In this place Mr Moseley's account of the vegetation, &c., of Marion Island, in his Notes by a Naturalist on the Challenger, pp. 163–170, is repeated with some trifling alterations to bring it in harmony with the other part of this work:—

"Marion Island, which with the smaller island of Prince Edward makes up the Prince Edward group, was sighted on the evening of December 25. The centre of Marion Island is in lat. 46° 52′ S., long. 37° 45′ E., that of Prince Edward Island in lat. 46° 36′ S., long. 37° 57′ E., the city of Lyons being in a nearly corresponding latitude in the northern hemisphere.

"The islands are distant from the Crozets (which lie to the north-east of them, and are the nearest land) 450 miles. From the African continent they are distant about 960 miles, the nearest point being about Cape Recife at Algoa Bay. From Kerguelen's Land Marion Island is distant about 1200 miles; from Lindsay and Bouvet Islands, about 1400 miles; from Tristan da Cunha and Gough Islands, about 2150 miles; and, lastly, from the Falkland Islands and Fuegia (to which, in common with all the other Antarctic islands hitherto examined, except the Campbell and Auckland group, they are in their flora most nearly related) they are distant about 4500 geographical miles.

"The islands lie, as do the Crozets and Kerguelen's Land, well within the course of the Antarctic

[1] Concerning the vegetation of Diego Alvariez or Gough Island, in about 40° 30′ S. lat., and 10° W. long., we know nothing beyond the statement published by Mr Moseley (Journ. Linn. Soc. Lond. xiv. p. 384), that he was informed by a Tristan settler, who had lived for months in the island, that the same flowering plants and tree (*Phylica*) grow there as in the Tristan da Cunha group, but that the ferns are different.

Of the botany of the group of islands in about 54° S. lat., and 5° W. long., comprising Bouvet, Lindsay, and Thompson, we have no knowledge whatever.

drift, which, fusing with the Cape Horn current, sweeps in an easterly direction across the Antarctic sea, and further within the broad belt of prevalent westerly winds. The combined action of the winds and the current has, no doubt, brought about in greater part the diffusion of the Fuegian and Falkland Island plants, to the islands lying eastward of them; but it is possible that the multitudes of sea-birds inhabiting the islands, and nesting, as they do, amongst the herbage, may have been of influence in the matter by transporting seeds attached to their feathers or feet. Most of the birds are of widely wandering habits.

"The island of Marion, the larger of the two forming the group, and on which alone of the two an opportunity of landing was afforded, is about eleven miles in length, eight in extreme breadth, and about eighty square miles in area. The highest point is about 4250 feet above the sea-level. The island is entirely volcanic, and presents the usual features of volcanic islands which are of considerable age. The highest land is in the centre; and irregular slopes lead down to the sea on all sides. These slopes are of very moderate inclination, and are broken in numerous places by shallow valleys bounded by cliffs where the more ancient flows of lava have suffered denudation. These valleys are occupied by more recent lava-flows, which still retain their rough pinnacled upper surface. Further, all over the slopes and summits of the island are scattered irregularly numerous small cones, formed mostly of conspicuously red scoriæ. The lava is basaltic, presenting in many places in the cliffs a columnar structure. Some sand gathered on the shores of a small freshwater lake near the sea was full of augite and olivine crystals.

"The island was sighted, together with Prince Edward Island, on December 25, but was not approached closely till the morning of December 26. The upper part of the island was covered with snow, commencing, as usual, on the slopes, as patches lying unmelted in sheltered hollows, succeeded by a general thin coating or powdering over, through which the black rock showed out in all directions, and above this, again, on the highest cones and peaks, forming a continuous sheet of glistening white. The summits were enveloped in clouds, which lifted or dispersed in a partial manner from time to time. Below the snow, and up amongst the patchy region, the slopes of the island were covered with a coating of green, which formed a contrast to the dark cliffs and red lower cones, which were almost destitute of verdure, and had very little snow upon them. Here and there large patches of yellow showed out amidst the green, and were conspicuous even at some distance from the shore. It was found that these patches were formed of mosses. The mosses, indeed, occurring thus in patches, some dark, some nearly white, and others yellow, form the principal features in the vegetation as seen from a distance, showing out, as they do, amongst the very uniform mixture of phanerogamic plants. The small rocky projections on the rough surfaces of the modern lava-flows, standing out dark above the verdure, have at a distance exactly the appearance of low bushes with dark foliage, and were at first believed to be such. The day was remarkably fine and sunshiny.

"The rocks, about high-tide mark, are covered with a dense growth of the large brown seaweed (*Durvillea utilis*), which is of great assistance in breaking the surf. Beyond the ordinary reach of the sea, but still within the beach-line, the rocks are covered with a crassulaceous plant (*Tillæa moschata*, DC.), occurring also in Kerguelen's Land. Succeeding the beach is a thick growth of herbage, investing a swampy, black, peaty soil, which covers the underlying rock more or less thickly everywhere on the lower ground, and extends up with the herbage almost to the snow. The principal plants forming the thick growth are *Acæna adscendens*, *Azorella selago*, and *Poa cookii*. The *Acæna* is by far the most abundant plant on the island.

"The *Azorella* forms low, convex, bright green patches in intervals between the *Acæna* or cake-like masses at its roots.

"*Azorella selago* is a characteristic plant of the Southern Islands, forming large convex masses often several feet in diameter, which are compact and firm, and when on solid ground, yield little to the tread. The masses are made up of the stems and shoots of the plants, closely packed together side by side, with their flowering tips and small, stiff, and tough leaves forming an even, rounded surface at the exterior, being all of the same length. The interior of the masses is full of dead leaves and stems. The whole, where growing in abundance, forms sheets and hummocks, which invest the soil sometimes for acres in extent at Kerguelen's Land with a continuous elastic green coating. An allied plant (*Bolax glebaria*) forms similar masses at the Falkland Islands, and there is a tendency in many Antarctic plants to assume a similar habit, as in the case, *e.g.*, of *Lyallia kerguelensis*.

"The *Poa* is abundant everywhere, mingled with the *Acæna* and *Azorella*. The plants are, no doubt, rendered especially luxuriant by the dung of the numerous sea-birds; but no mutual benefit arrangement has sprung up between the *Poa* and the penguins, as it has at the Tristan da Cunha group between the penguins and *Spartina arundinacea*.

"*Poa cookii* nowhere forms a tussock. The rookeries of king penguins are entirely bare, and the grass is not more luxuriant around the nests of the golden-crested penguins than elsewhere. The *Poa* was the only grass found in flower in the island. Different-looking forms were observed, especially around the numerous pools of water on the hill slopes; but they are possibly mere modifications of the same grass due to alteration of conditions. None of them were in flower. *Pringlea antiscorbutica*, the Kerguelen cabbage, is, at least in the part of the island explored, by no means so abundant as at Kerguelen's Land. It was some time before a plant was found; but subsequently a good many were met with, but not growing in groups of more than four or five plants. Some were found on the very verge of the shore, within reach of the spray, and the rest on the banks of a small rivulet. The cabbage was mostly in full flower and bud, with sepals and anthers complete. No plants were found with seeds at all ripe. The last year's seeds were decayed. This plant at least would appear to have a regular summer flowering-season, since Sir Joseph Hooker found only the fruit at Kerguelen's Land in the winter.

"Of the ferns, *Lomaria alpina* is the most conspicuous, forming thick and wide patches amongst the *Acæna* and *Poa*, and occurring abundantly everywhere. *Aspidium mohriodes* was found growing under sheltered banks beside the small stream, together with the other three ferns.

"*Hymenophyllum tunbridgense*, β *wilsoni*, a British species, and *Polypodium australe*, grow abundantly on the sheltered sides of the projecting rock-masses already mentioned, but are dwarfed and almost hidden amongst the mosses. They grow in greatest luxuriance on the damp banks of the stream.

"The mosses are in most striking abundance, and, in some very wet places, form continuous sheets over the ground many square yards in extent. Lichens are not in very great quantity, except the incrusting forms, which are tolerably abundant on the rocks.

"An attempt was made to reach the actual upper limit of vegetation, but failed from being commenced too late in the day. The ascent was up the bed of the small stream already mentioned, which lay at the verge of one of the modern lava-flows, where it abutted on a low cliff, exposing a more ancient flow in section. The more recent flow had a very gradual inclination of not more than 8°. The first scattered patches of snow were encountered at about an elevation of 800 feet. A patch of the cabbage was met with at 1000 feet.

"The highest point reached was at about 1500 feet elevation. Here *Ranunculus biternatus* had disappeared, and, where growing a little lower down, was very much dwarfed; and *Azorella*, with a few mosses, formed the principal vegetation, but the green was merely dotted over the bare rock and stones. Patches of snow were here frequent, and the *Azorella* appeared, from this point, to be continued on for about 300 feet more, becoming scantier and scantier. The absolute limit of vegetation may probably be placed at about 2000 feet, for the part explored was somewhat sheltered. A red cone of scoriæ more exposed was quite bare of green from about 1000 feet elevation upwards.

"At about 1400 feet elevation, the water in a shallow pool exposed to the sun was found to have a temperature of 65° F., the temperature of the air in the shade being 44°. At 900 feet, a similar pool, but one which had a small stream of colder water running into it from the cliff, had a temperature of 55°, the air here being at 45°. The thermometer here, when plunged into the midst of a rounded mass of *Azorella*, rose to 50°. It is evident that these mounds retain and store up a considerable quantity of the sun's heat; and this fact probably yields a partial explanation of their peculiar form, which is that of so many otherwise widely different Antarctic plants, and of some New Zealand Alpine plants (*Raoulia*, *Haastia*). No doubt, power gained of resistance to wind is one of the chief causes of assumption of this form.

"The island being of such considerable area, and so short a time having been available for the examination of its flora, no conclusions can be drawn from the absence of certain plants, such as *Lyallia*, which might have been expected to occur there, since they occur in Kerguelen's Land, associated with nearly all those found. Although the few plants on such islands as these are, as a rule, widely spread, yet some appear to be local and somewhat scarce; as, for example, the *Aspidium*, which was only found at the last moment under the banks of one of the streams. It is thus highly probable that several plants have been overlooked, and amongst them possibly *Lyallia*. The nine flowering plants collected in the island are all identical with species growing in Kerguelen's Land; and the same is the case with the Club-mosses. Of the ferns, two occur in Kerguelen's Land, which has also two others not occurring here. Fifteen vascular plants in all were found in the island of Marion.

"Mr Darwin suggests that Kerguelen's Land has been mainly stocked by seeds brought with ice and stones on icebergs.[1] The occurrence of *Pringlea* on Marion Island, as also on the Crozets and Kerguelen's Land, probably points, however, to an ancient land-connection between these islands, which the antiquity and extent of denudation of the lavas would seem to bear out. It is difficult to see how such seeds as those of *Pringlea* could have been transported from one island to another by birds; and these seeds seem to be remarkably perishable;[2] besides, the distinctness of the genus points to a former wide extent of land on which its progenitors became developed. The existence of fossil tree-trunks in Kerguelen's Land points to similar conditions. Sir J. D. Hooker, in the Flora Antarctica, p. 220, expressed the above conclusion after his voyage with Captain Ross, thirty-five years ago, and with singular foresight suggested that there 'has taken place 'the destruction of a large body of land, of which St Paul and Amsterdam Islands may be the only remains; or the subsidence of a chain of mountains running east and west, of which Prince Edward Island, Marion, and the Crozets are the exposed peaks.' This view is directly confirmed by the discovery by the 'Challenger's' soundings of the Kerguelen plateau, which 'rises in many parts to within 1500 fathoms of

[1] Origin of Species, ed. vi. p. 354.

[2] Seeds sent to Kew by Mr Moseley germinated.

the sea surface, and forms the common foundation of all the islands situated in this part of the world, viz., Prince Edward's Islands, the Crozet Islands, the Kerguelen Group, the Heard Islands, and the islands of St Paul and Amsterdam,' 'as proved by the soundings of both the "Challenger" and the "Gazelle."' The occurrence with the cabbage on Heard Island of the helpless wingless fly,[1] seems a further proof that the plant was not conveyed to the various islands by birds. It is hardly possible that both could have been transported, and the fly could probably not exist without the cabbage. The existence of the same species of freshwater fish in New Zealand, Tasmania, the Falkland Islands, and South America, points also to the former existence of more intervening land between these points."

To the foregoing we have nothing to add beyond the remarks under each species in the ensuing list.

[1] *Calycopteryx moseleyi*, Eaton, Verrall in Phil. Trans. Roy. Soc. Lond., clxviii. p. 239, t. 14, fig. 1 a–e.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.

RANUNCULACEÆ.

Ranunculus biternatus, Sm.

Ranunculus biternatus, Sm. in Rees' Cycl.; DC., Prodr., i. p. 30; Deless., Ic. Pl., i. t. 24; Hook., Ic. Pl., t. 497; Hook. f., Fl. Antarct., p. 224, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 17 (sub. *Ranunculo crassipedi*).
Ranunculus exiguus, D'Urv. in Mém. Soc. Linn. Par., iv. p. 615.
Ranunculus flaccidus, Banks et Sol. MSS. ex Hook. f., Fl. Antarct., ii. p. 224.

MARION ISLAND. *Moseley.*

Fuegia; Falklands; Tristan da Cunha? Kerguelen; Amsterdam Island.

In the Botany of Kerguelen Island,[1] Sir Joseph Hooker points out the close affinity of his *Ranunculus crassipes* with the South American *Ranunculus biternatus*, and regards it as a derivative form of this plant, stating that it differs chiefly in its robustness and simple leaves. The Marion Island plant is quite the same as the American, and only a portion of the Kerguelen specimens belongs to the form originally described and figured as *Ranunculus crassipes*. The leaves of some of the Kerguelen Island specimens are as much divided as those of some of the American specimens, while others are intermediate between these and typical *Ranunculus crassipes*.

CRUCIFERÆ.

Pringlea antiscorbutica, R. Br.

Pringlea antiscorbutica, R. Br. in Hook. f. Fl. Antarct., p. 239, t. 90 et 91; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389; Kidder in Bull. U.S. Nat. Mus., iii. p. 21; Dyer in Proc. Linn. Soc. Lond., 1874, p. 34; Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 18.

MARION ISLAND. *Moseley.*

This remarkably distinct and valuable vegetable is restricted to the islands of the South Indian Ocean, where it is one of the commonest plants. It occurs in the Crozets, Kerguelen, and Heard Islands, but it is absent from the Tristan da Cunha group, and Amsterdam and St Paul Islands, which are not in so high a latitude by ten to fifteen

[1] *Philosophical Transactions of the Royal Society of London*, clxviii. p. 17.

degrees, and enjoy a relatively warmer climate, though by no means a warm one. In Kerguelen Island it is very abundant. The specimens brought from Marion Island by Mr Moseley are dwarf—five to seven inches high; and the seed-vessels are only very slightly hairy, and about a third of an inch long.

Pringlea antiscorbutica is the only species of the genus, which is a very distinct one in habit, though closely allied in structure to the northern *Cochlearia*.

[The *Cerastium* mentioned by Mr Moseley (Journ. Linn. Soc. Lond., xiv. p. 387) does not appear to have been dried, probably because it was regarded as a certainly introduced plant.]

PORTULACEÆ.

Montia fontana, Linn.

Montia fontana, Linn., Sp. Pl., ed. 1. p. 87; Hook. f., Fl. Antarct., p. 278, et Handb. Fl. N. Zeal., p. 27.

MARION ISLAND: *Moseley*.

Generally diffused in both the north and south temperate regions, including the Bermudas, Kerguelen Island, and other remote islets.

ROSACEÆ.

Acæna adscendens, Vahl.

Acæna adscendens, Vahl, Enum. Pl., i. p. 297; Hook. f., Fl. Antarct., p. 10, et p. 268, t. 96; Handb. Fl. N. Zeal., p. 56; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389.

Acæna affinis, Hook. f., Fl. Antarct., p. 268, t. 96, B., et in Phil. Trans. Roy. Soc. Lond., clxviii., p. 20; Moseley in Journ. Linn. Soc. Lond., xiv. p. 387.

MARION ISLAND. *Moseley*.

As here limited, this species inhabits the Crozets, Kerguelen Island, New Zealand, Macquarie Island, Fuegia, and the Falklands.

The flowers appear to be functionally unisexual, and to exhibit differences in the relative length of the stamens and other parts. The characters upon which *Acæna affinis* was founded depending upon mere sexual differences, Professor Oliver reduced the species.

Most of the New Zealand specimens are altogether smaller, and have smaller leaves than those from the islands of the South Indian Ocean and from America, but the Macquarie Island plant is equally robust.

CRASSULACEÆ.

Tillæa moschata, DC.

Tillæa moschata, DC., Prodr., iii. p. 382; Hook. f., Handb. Fl. N. Zeal., p. 61; Phil. Trans Roy. Soc. Lond., clxviii. p. 20; Hook., Ic. Pl., t. 535.
Bulliarda moschata, D'Urv. in Mém. Soc. Linn. Par., iv. p. 618; Hook. f., Fl. Antarct., p 15 et p. 278.
Crassula moschata, Forst., Comm. Gœtt., ix. p. 26 (reprint, p. 16).
Bulliarda magellanica, DC., Bull. Philom., n. 49.

Marion Island. *Moseley.*

Diffused all round the south temperate zone, including the Crozets and Kerguelen Island.

HALORAGEÆ.

Callitriche verna, Linn., subsp. *obtusangula.*

Callitriche verna, Linn., subsp. *obtusangula*, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.
Callitriche verna, Linn., Sp. Pl., ed. 2, p. 6; Hook. f., Fl. Antarct., p. 272; Handb. Fl. N. Zeal., p. 68.
Callitriche obtusangula, Le Gall.; Hegelm., Monogr. Callit., p. 54 (species); Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.
Callitriche antarctica, Engelm.; Kidder in Bull. U.S. Nat. Mus., iii. p. 23, ex Hook. f., l. c.; Oliver in Journ. Linn. Soc. Lond. xiv. p. 380.

Marion Island. *Moseley.*

This form occurs in many of the southern islets, as the Crozets, Kerguelen, Heard, and Campbell Islands, as well as in Polynesia. We have only seen European localities recorded for it in the northern hemisphere. *Callitriche verna* in a broad sense is generally diffused in temperate regions.

UMBELLIFERÆ.

Azorella selago, Hook. f.

Azorella selago, Hook. f., Fl. Antarct., p. 284, t. 99; et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.

Marion Island. *Moseley.*

This species occurs in Fuegia, the Falklands, the Crozets, Kerguelen, Heard, and Macquarie Islands — a noteworthy area of distribution, especially in relation to its existence in the last-named island, and its absence from the Tristan da Cunha group.

The genus *Azorella*, even in the extended sense of Bentham and Hooker's Genera Plantarum, and in Bentham's Flora Australiensis, is confined to the south temperate zone and Andine America; but the section to which *Azorella selago* belongs, which is characterised by the dense cushion-like habit of growth of its species, is peculiar to America and the islands and islets as far eastward as Macquarie Island. The New Zealand, and especially the Australian species, are very different in habit, yet their carpological characters are much the same.

GRAMINEÆ.

Poa cookii, Hook. f.

Poa cookii, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 22.
Festuca cookii, Hook. f., Fl. Antarct., p. 382, t. 139.

MARION ISLAND. *Moseley.*

Kerguelen and Heard Islands.

This was the only grass found on the island in flower, but Mr Moseley brought home foliage of another, which is sweet-scented in the dried state.

[*Agrostis magellanica* (*Agrostis antarctica*) is by mistake recorded from Marion Island in the Botany of Kerguelen Island (Phil. Trans. Roy. Soc. Lond., clxviii. p. 21).]

CRYPTOGAMÆ.

FILICES.

Hymenophyllum tunbridgense, Smith, *β wilsoni*, Hook.

Hymenophyllum tunbridgense, Smith, *β wilsoni*, Hook. and Bak., Synop. Fil., p. 67.
Hymenophyllum wilsoni, Hook., Sp. Fil., i. p. 95 (species); Moseley in Journ. Linn. Soc. Lond., xiv. p. 387.
Hymenophyllum asperulum, Kunze, Pl. Crypt. Poepp., p. 109.

MARION ISLAND. *Moseley.*

As limited in the Synopsis Filicum, this species is very widely diffused in both the northern and the southern hemispheres. The form from Marion Island is very dwarf, the tallest fronds being only about three-quarters of an inch high, with oblong, obtuse, sparsely denticulate lobes, and entire involucres.

Lomaria alpina, Spreng.

Lomaria alpina, Spreng.; Hook., Fil. Exot., t. 32; Hook. and Bak., Synop. Fil., p. 178; Moseley in Journ. Linn. Soc. Lond., xiv. p. 387.
Lomaria penna-marina, Mett. in Kuhn Fil. Afr., p. 92.

MARION ISLAND. *Moseley.*

Generally diffused all round the south temperate zone.

Aspidium (Polystichum) mohrioides, Bory.

Aspidium (*Polystichum*) *mohrioides*, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 267, t. 35; Hook., Sp. Fil., iv. p. 26; Hook. and Bak., Synop. Fil., p. 252; Hook. f., Fl. Antarct., p. 392, t. 149.

MARION ISLAND. *Moseley.*

Previously to 1873 this fern, which is easily distinguished from its nearest allies, was only known from the extreme south of America, the Falkland Islands, and one or two places in the mountains of Chili; but in 1879 it was discovered in the mountains of Northern California, at an altitude of 7500 to 8000 feet, and De l'Isle collected it in Amsterdam Island the year after (1874) Moseley found it in Marion.

Polypodium (Grammitis) australe, Mett.

Polypodium (Grammitis) australe, Mett., Polypod., p. 36; Hook. and Bak., Synop. Fil., p. 322.

MARION ISLAND. *Moseley.*

Widely spread in the south temperate zone, including the Tristan da Cunha group and Amsterdam Island.

Mr Moseley's Marion Island specimens of the plant are dense tufts, bearing fronds from a quarter to three quarters of an inch long.

[*Polypodium vulgare* is recorded from Marion Island in the Botany of Kerguelen Island (Phil. Trans. Roy. Soc. Lond., clxviii. pp. 16 and 23), but no specimen can be found, and it is probably an error, arising from a confusion of the lists.]

LYCOPODIACEÆ.

Lycopodium clavatum, Linn., var. *magellanicum*, Hook. f.

Lycopodium clavatum, Linn., var. *magellanicum*, Hook. f., Fl. Antarct. p. 113; Swartz, Synop. Fil., p. 180 (species); Spring, Monogr. Lycopod., partie i., p. 96, et partie ii., p. 46.

MARION ISLAND. *Moseley.*

All round the temperate zone of the southern hemisphere; and the typical form is as widely dispersed in northern countries having a cold damp climate.

Lycopodium saururus, Lam.

Lycopodium saururus, Lam.; Spring, Monogr. Lycopod., partie i., p. 21, et partie ii., p. 6.
Lycopodium selago, Linn., var. *saururus*, Hook. f., Fl. Antarct., p. 394, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 23.

MARION ISLAND. *Moseley.*

South Africa and the mountains of Western Tropical Africa, South America, and in most of the islets from Ascension to Kerguelen. Typical *Lycopodium selago*, Linn., is almost universal in damp, cold regions. We have been guided by Mr J. G. Baker in retaining specific rank for *Lycopodium saururus*.

MUSCI.[1]

Cynodontium australe, Mitt.

Cynodontium australe, Mitt. in Journ. Linn. Soc. Lond., xii. p. 42 et xv. p. 70.

MARION ISLAND.—Fruit past maturity—*Moseley.*

Dicranum (Isocarpus) antarcticum, Mitt.

Dicranum (Isocarpus) antarcticum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 63, et xv. p. 70.

MARION ISLAND.—A few stems with unripe fruit appear to belong to this species; they were growing in a tuft of *Jungermannia colorata.—Moseley.*

Campylopus introflexus, Mitt.

Campylopus introflexus, Mitt. in Journ. Linn. Soc. Lond., xii. p. 84, et xv. p. 70.

MARION ISLAND.—Barren—*Moseley.*

Campylopus cavifolius, Mitt.

Camplyopus cavifolius, Mitt. in Journ. Linn. Soc. Lond., xii. p. 87, et xv. p. 70.

MARION ISLAND.—Also without fruit in dense tufts—*Moseley.*

Grimmia (Dryptodon) chlorocarpa, Mitt.

Grimmia (Dryptodon) chlorocarpa, Mitt. in Journ. Linn. Soc. Lond., xv. p. 70 (*nomen tantum*).
Racomitrium crispulum, Hook. f. et Wils., Fl. N. Zeal., ii. p. 75.

MARION ISLAND.—Without fructification—*Moseley.*

Grimmia (Racomitrium) lanuginosa, Mitt.

Grimmia (Racomitrium) lanuginosa, Mitt. in Journ. Linn. Soc. Lond., xii. p. 104, et xv. p. 70.

MARION ISLAND.—Tall stems, without fruit—*Moseley.*

Apalodium australe, Mitt.

Apalodium australe, Mitt. in Journ. Linn. Soc. Lond., xii. p. 239, et xv. p. 70.
Orthodontium australe, Hook. f. et Wils., Fl. Antarct., p. 412, t. 153, fig. 5.

MARION ISLAND.—With fruit not quite mature—*Moseley.*

The group of mosses of which *Apalodium australe* is a fairly representative species, has had all its species described as belonging to *Orthodontium*, but the original *Orthodontium*

[1] Extracted from the *Journal of the Linnean Society of London*, with additional notes, by W. Mitten.

gracile is always supposed to be nearly allied to *Bryum*, to which genus no species of *Apalodium* seems to have either affinity or resemblance. This species is represented in the Flora Antarctica as having the processes of the internal peristome arising from a considerable membranous base which cannot be found in the specimens. The inflorescence is syncœcious. The *Apalodium pellucens* (Hook., Ic. Plant., t. 34), from the Andes, has its male flowers at the apices of short branches, and the normal position of its capsules is probably erect. From this, Hampe thought *Apalodium longisetum* (Linnæa, 1863, p. 129), different, and proposed *Apalodium confine*, also from the Andes of New Granada, but they, with the original *Apalodium pellucens* gathered by Jameson, seem so similar, that they might have been gathered in the same tuft of moss: these, with the dicœcious *Apalodium tenue*, C. Müll. (Syn., i. p. 240), from Chili, are the known species of the South American continent. *Apalodium lineare*, Schwægr., t. 188 (*Orthodontium*), from South Africa, is described and figured with the peristome internal and external equal in length. In *Apalodium infractum*, Dozy et Molkenb. (Musc. Archip. Ind., ii. t. 14,) the peristome is figured with the internal processes twice the length of the teeth, and without any membrane at their base, and such is the case in Horsfield's specimens from Java. From the Blue Mountains, New South Wales, gathered by the Rev. R. Collie, Baron von Mueller sends another species, *Apalodium inflatum*, Mitt.[1]

Entosthodon laxus, Mitt.

Entosthodon laxus, Mitt. in Journ. Linn. Soc. Lond., xv. p. 70.
Physcomitrium laxum, Hook. f. et Wils., Fl. Antarct., p. 399, t. 151, fig. 5.

MARION ISLAND.—A single stem, with young fruit and two or three barren plants—*Moseley*.

Bartramia (Philonotis) tenuis, Tayl.

Bartramia (*Philonotis*) *tenuis*, Tayl.; Hook. f., Handb. Fl. N. Zeal., p. 448; Mitt. in Journ. Linn. Soc. Lond., xv, p. 70.

MARION ISLAND.—Without fruit—*Moseley*.

Bartramia (Philonotis) remotifolia, Hook. f. et Wils.

Bartramia (*Philonotis*) *remotifolia*, Hook. f. et Wils., Fl. Tasm., ii. p. 193, t. 174, fig. 3; Mitt. in Journ. Linn. Soc. Lond., xv. p. 70.

MARION ISLAND.—In extensive patches with perfect fruit—*Moseley*.

[1] Monoicum. Folia erecto-patentia, linearia, integerrima, theca in pedunculo brevi urceolata, evacua inflata; peristomii simplicis externi dentibus brevibus.—Caules in cæspitem latum congesti 2 mm. alti. Folia subnitida, longitud. 4 mm. attingentia. Pedunculus 3 mm. longus. Theca erecta, breviter ovalis, evacua sub ore parvo contracto urceolata.

Bartramia (Glyphocarpus) marionensis, Mitt.

Bartramia (Glyphocarpus) marionensis, Mitt., n. sp.
Bartramia quadrata, Mitt. in Journ. Linn. Soc. Lond., xv. p. 70, non Hook.

Habitus staturaque *Bartramiæ quadratæ* foliorum areolatione autem e cellulis brevioribus latioribusque, sicca et humida rigida, nitida.

MARION ISLAND. *Moseley.*

This small species, with plumose foliage, closely resembles *Bartramia quadrata*, but on a close comparison it is found to have its leaf-cells wider, and only half as long; they are, in fact, two or three times longer than wide, whilst in *Bartramia quadrata* they are six times longer than wide. *Bartramia quadrata* and *Bartramia capensis* formed the genus *Glyphocarpus* of Brown; they differ from the *Bartramidula* of Schimper in their stiff foliage, but too little is known of these species to form an opinion of their affinities; they seem to show some approximation to *Breutelia* rather than to *Philonotis*.

Bartramia (Breutelia) dumosa, Mitt.

Bartramia (Breutelia) dumosa, Mitt. in Journ. Linn. Soc. Lond., xii. p. 267, et xv., p. 70.

MARION ISLAND.—Sterile—*Moseley.*

The original specimens of this species, collected by Sir J. D. Hooker in Hermite Island, have the seta about half an inch long, and in this agree exactly with those from Marion Island, and differ from the *Bartramia chilensis*, Lorentz, which has a seta from one to one and a half inches long—a small difference, but it enables them to be distinguished at sight. This was overlooked at the time the Flora Antarctica was published.

Bryum pendulum, Hornsch.

Bryum pendulum, Hornsch.; Jäger, Gen. et Sp. Musc., i. p. 145; Mitt. in Journ. Linn. Soc. Lond., xv. p. 70.

MARION ISLAND.—Without fruit—*Moseley.*

Bryum lævigatum, Hook. f. et Wils.

Bryum lævigatum, Hook. f. et Wils., Fl. Antarct., p. 415, t. 154, fig. 3; Mitt. in Journ. Linn. Soc. Lond., xv. p. 70.

MARION ISLAND.—Also sterile, but in fine state—*Moseley.*

Mielichhoferia tenuiseta, Mitt.

Mielichhoferia tenuiseta, Mitt. in Journ. Linn. Soc. Lond., xv. p. 70 (*nomen tantum*).

MARION ISLAND.—In luxuriant growth, with immature fruit—*Moseley.*

Distichophyllum fasciculatum, Mitt. (Pl. LIII.)

Distichophyllum fasciculatum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 71.

Monoicum. Caulis debilis, erectus, fasciculatim ramosus, ruber. Folia compressa, caulina omnia conformia, lateralia patentia, oblongo-ovalia, obtusa, apiculo brevissimo sæpius obsoleto terminata, planiuscula, nervo tenui ultra medium evanido, triplici serie cellularum angustissimarum marginata, integerrima, cellulis hexagonis limpidis areolata; perichætialia erecta, interna late ovalia, convoluta, apice acuta, subserrulata, immarginata, enervia. Theca in pedunculo elongato rubro lævi erecta, ovalis, collo sensim angustato.

Caulis uncialis biuncialisve cum foliis lineam latus. Folia pallide stramineo-fusca, sicca vix compressa marginibus flexuosis. Pedunculus unciam brevior.

Like *Distichophyllum sinuosum*, but with cells twice as large and an erect capsule.

Marion Island.—Growing in a tufted manner intermixed with *Jungermannia colorata*—*Moseley*.

This species agrees very nearly with *Distichophyllum amblyophyllum*, Mitt. (*Hookeria*, Hook. f. et Wils.), from New Zealand, but differs in the presence of a minute apiculus to its leaves, which have also a shorter nerve, and its capsule is nearly erect and not pendulous. It resembles also *Distichophyllum sinuosum* (*Hookeria*, Hook. f. et Wils.) from Tasmania. *Distichophyllum krausii* (Lorentz, *Mniadelphus*) from Chili, has a longer nerve and no apiculus; all these species are very similar in size and in the colour of their foliage, and with *Distichophyllum microcarpum* (*Hookeria*, Hook. f. et Wils.) of New Zealand, form a small group of species agreeing in the rounded apices of their leaves, and in having their capsules supported on a smooth fruit-stalk.

Distichophyllum imbricatum, Mitt. (Pl. LIII.)

Distichophyllum imbricatum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 71.

Caulis rubro-fuscus, fasciculatim ramosus, erectus. Folia concava, fere teretiuscule imbricata, ad ramorum apices in gemmam subacutam congesta, ovali-oblonga, acuta, apiculo parvo terminata, duplice serie cellularum angustissimarum marginata, nervo angusto ultra medium evanescente, cellulis limpidis hexagonis areolata.

Caulis semiuncialis cum foliis vix compressis lineam latus.

Similar to *Distichophyllum flaccidum*, but with acute leaves which at the apices of the stems are imbricated in a cuspidate manner.

Marion Island.—In a scattered manner amongst *Gottschea carnosa*—*Moseley*.

In the specimens of this moss the stems have leaves imbricated equally on all sides, but they are too scanty to show whether this be a constant character. The outline of the leaves is nearly that of *Distichophyllum zollingeri*, Bry. Jav., and of *Distichophyllum adnatum*, Mitt. (Fl. N. Zeal., t. 93, 94); they are of a dull brownish green, with their cells very iridescent.

Plagiothecium antarcticum, Mitt.

Plagiothecium antarcticum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 71.

Monoicum, cæspitosum, ramis ascendentibus. Folia compressa, subfalcata, nitida, caulina ovata, acuminata, integerrima, enervia, ramea ovato-lanceolata, tenuiter acuminata, subenervia, omnia basi subcordata, cellulis angustis elongatis areolata; perichætialia convoluta, late ovata, breviter acuminata. Theca in pedunculo elongato rubro, ovalis, inæqualis suberecta inclinatave, operculo breviter conico, peristomii interni ciliis in unum coalitis, inter processos carinatos dentium longitudinis impositis in membranam usque ad dimidiam dentium longitudinem insidentibus.

Habitus adspectusque omninò *Plagiothecii pulchelli*, foliis autem basi ad insertionem subcordatim dilatatis.

MARION ISLAND. *Moseley.*

Stereodon cupressiformis, Linn. (*Hypnum*).

Stereodon cupressiformis, Linn. (*Hypnum*); Mitt. in Journ. Linn. Soc. Lond., xv. p. 71.

MARION ISLAND.—A few barren stems—*Moseley.*

Acrocladium politum, Mitt.

Acrocladium politum, Hook. f. et Wils., Fl. Antarct., p. 416, t. 154, fig. 2 (*Hypnum*); Mitt. in Journ. Linn. Soc. Lond., xv. p. 71.

MARION ISLAND.—Small fragments attached to the lower parts of *Grimmia lanuginosa*—*Moseley.*

Amblystegium decussatum, Mitt.

Amblystegium decussatum, Hook. f. et Wils., Fl. N. Zeal., ii. t. 90, fig. 2 (*Hypnum*); Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

MARION ISLAND.—A slender state, unlike the larger New Zealand forms; but the substance of the leaves is not different—*Moseley.*

Hypnum (Brachythecium) subpilosum, Hook. f. et Wils.

Hypnum (Brachythecium) subpilosum, Hook. f. et Wils., Fl. Antarct., p. 418, t. 154; Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

MARION ISLAND.—Without fruit—*Moseley.*

Eustichia longirostris, Mitt.

Eustichia longirostris, Mitt. in Journ. Linn. Soc. Lond., xii. p. 603, et xv. p. 72.

MARION ISLAND.—Barren—*Moseley.*

Psilopilum australe, Mitt.

Psilopilum australe, Hook. f. et Wils., Fl. N. Zeal., ii. t. 87, fig. 6 (*Polytrichum*); Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

MARION ISLAND.—Male plants only—*Moseley.*

HEPATICÆ.[1]

Jungermannia colorata, Lehm. et Lindenb.

Jungermannia colorata, Lehm. et Lindenb.; Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

MARION ISLAND.—In large tufts, with perfect fruit—*Moseley*.

Plagiochila heterodonta, Hook. f. et Tayl.

Plagiochila heterodonta, Hook. f. et Tayl. in Hook. Lond. Journ. Bot., 1844, p. 460 (*Jungermannia*, § *Plagiochila*).

Plagiochila marionensis, Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

MARION ISLAND. *Moseley*.

Tall specimens, the stems being from 5 to 7 cm. in length, with the leaves appressed and imbricated, as in *Plagiochila retrospectans*. Thus they have a very different look from those originally collected in Kerguelen. The perianths on these larger stems are compressed, oval, the mouth small, its lips crenate, and there is no dorsal wing.

Lophocolea pallidovirens, Hook. f. et Tayl.

Lophocolea pallidovirens, Hook. f. et Tayl., Fl. Antarct., p. 439, t. 159 (*Jungermannia*); Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

MARION ISLAND.—In small quantity, amongst mosses—*Moseley*.

Lophocolea novæ-zealandiæ, Nees.

Lophocolea novæ-zealandiæ, Nees; Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

MARION ISLAND.—Without fruit—*Moseley*.

Gottschea carnosa, Mitt. (Plate LIII.)

Gottschea carnosa, Mitt. in Journ. Linn. Soc. Lond., xv. p. 72.

Caulis ascendens, crassus, pallidus, carnosus. Folia patentia, laxe imbricata, lobo ventrali obovato obtuso, dorsali dimidiato obovato usque fere ad apicem lobi ventralis producto, basi cum lobo opposito imbricato caulem tegente, margine alæformi lobi ventralis infra medium lineæ conjunctionis desinente, ubique integerrima, carnosula, lævia. Amphigastria lunulata, cauli appressa.

Caulis uncialis biuncialisque, simplex furcatusve, sesquilineam crassus, cum foliis lineas tres latus, latere ventrali radicellis brevibus fuscis. Folia pallide ceraceo-viridia, seniora pallide fusca.

Near *Gottschea pachyphylla*, but different in the rounded apices of its leaves.

MARION ISLAND. *Moseley*.

[1] Extracted from the Journ. Lind. Soc. Lond., xv. pp. 72, 73, 1876, with additional notes by W. Mitten.

Lepidozia lævifolia, Hook. f. et Tayl.

Lepidozia lævifolia, Hook. f. et Tayl.; Mitt. in Journ. Linn. Soc. Lond., xv. p. 73.

MARION ISLAND.—Small barren stems, with the *Gottschea*, and among mosses—*Moseley*.

LICHENES.

Stereocaulon ?

Stereocaulon ?

MARION ISLAND.—On the ground; a mere fragment, and indeterminable—*Moseley*.

Cladonia fimbriata, Hoffm., forma *costata*.

Cladonia fimbriata, Hoffm., forma *costata*, Flœrke Clad. Comm., p. 66; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

MARION ISLAND.—On the ground; very sparingly fertile—*Moseley*.

In all temperate regions.

Neuropogon melaxanthus, Nyl.

Neuropogon melaxanthus, Nyl., Synop. Lich., i. p. 272; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

Usnea melaxantha, Achar., Meth. Lich., p. 307.

MARION ISLAND.—On rocks; sterile—*Moseley*.

All round the Arctic zone, except in Scandinavia; South America; Falklands; Kerguelen Island; New Zealand; Tasmania.

Peltigera polydactyla, Hoffm., forma *hymenina*, Nyl.

Peltigera polydactyla, Hoffm.; Nyl., Synop. Lich., i. p. 326; forma *hymenina*, Nyl., Lich. Scand., p. 90; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

MARION ISLAND.—Amongst mosses on the ground; fertile—*Moseley*.

Europe and North America, and recorded from various other countries, though not clearly identified.

Cœnogonium confervoides, Nyl.

Cœnogonium confervoides, Nyl., Enum. Gen., p. 119; Crombie in Journ. Linn. Soc. Lond., xvi. p. 222.

MARION ISLAND.—Amongst mosses on the ground; fertile—*Moseley*.

FUNGI.

Agaricus (Naucoria) glebarum, Berkl.

Agaricus (Naucoria) glebarum, Berkl. in Hook. f. Fl. Antarct., ii. p. 447, t. 162, fig. 3, et Journ. Linn. Soc. Lond., xv. p. 52.

MARION ISLAND.—On *Azorella*—*Moseley*.

Spores 0·0003 inch long.

Also in the Falkland Islands and Kerguelen Island.

Agaricus (Psilocybe) atro-rufus, Schæff.

Agaricus (Psilocybe) atro-rufus, Schæff., Ic. Fung. Bav., t. 234; Fries, Hymen. Europ., p. 300; Berkl. in Journ. Linn. Soc. Lond., xv. p. 53.

MARION ISLAND. *Moseley*.

Spores lemon-shaped; 0·00028 inch long.

Europe; North America; Cape of Good Hope; Kerguelen Island.

ALGÆ.[1]

MELANOSPERMEÆ.

SPOROCHNACEÆ.

Desmarestia viridis, Lamour.

Desmarestia viridis, Lamour in Ann. Mus. Par., xx. p. 43; Kütz., Sp. Alg., p. 570; Dickie in Journ. Linn. Soc. Lond., xv. p. 42.
Dichloria viridis, Grev., Alg. Brit., p. 39, t. 6.

MARION ISLAND. *Moseley*.

Widely spread in both hemispheres, especially in the temperate zones.

LAMINARIACEÆ.

Macrocystis pyrifera, K. A. Agardh.

Macrocystis pyrifera, K. A. Agardh, Sp. Alg., i. p. 47; Dickie in Journ. Linn. Soc. Lond., xv. p. 42.

MARION ISLAND. *Moseley*.

Widely spread in the Southern and Pacific Oceans.

[1] This small collection was made by Mr Moseley; the marine species mostly off Marion Island, in forty fathoms of water.

RHODOSPERMEÆ.

RHODOMELACEÆ.

Dasya berkeleyi, J. G. Agardh.

Dasya berkeleyi, J. G. Agardh, Sp. Alg., ii. p. 1179; Hook. f., Handb. Fl. N. Zeal., p. 673; Dickie in Journ. Linn. Soc. Lond., xv. p. 42.

Polysiphonia berkeleyi, Hook. et Harv., Crypt. Antarct., p. 174; Harv., Nereis Austr., p. 46; Kütz., Sp. Alg., p. 817.

MARION ISLAND. *Moseley.*

Kerguelen Island; Aucklands; New Zealand; Patagonia; Falklands.

LAURENCIACEÆ.

Cladhymenia pellucida, Dickie.

Cladhymenia pellucida, Dickie in Journ. Linn. Soc. Lond., xv. p. 42.

Fronde lineari, tenui, membranacea, pluries pinnata, costa pellucida apicem versus obsoleta percursa; pinnis pinnulisque alternis, pinnulis serrato-dentatis.

The specimens are destitute of fructification; but on some there are wart-like bodies like those of *Cladhymenia conferta*, figured in the Nereis Australis.

SPHÆROCOCCOIDEÆ.

Delesseria lyallii, Hook. f.

Delesseria lyallii, Hook. f. et Harv., Alg. Tasm., p. 7; Dickie in Journ. Linn. Soc. Lond., xv. p. 43; Hook. f., Fl. Antarct., ii. p. 176.

Hypoglossum lyallii, Kütz., Sp. Alg., p. 876.

MARION ISLAND. *Moseley.*

Kerguelen Island; Tasmania; Patagonia; Falklands.

CRYPTONEMIACEÆ.

Callophyllis dichotoma, Kütz.

Callophyllis dichotoma, Kütz., Sp. Alg., p. 746; Dickie in Journ. Linn. Soc. Lond., xv. p. 43.

Rhodymenia dichotoma, Hook. f. et Harv. in Hook. f. Fl. Antarct., i. p. 186, t. 72, fig. 1; Hook. f., Handb. Fl. N. Zeal., p. 693.

MARION ISLAND. *Moseley.*

New Zealand; Campbell Island.

Epymenia obtusa, Kütz.

Epymenia obtusa, Kütz., Sp. Alg., p. 787; Dickie in Journ. Linn. Soc. Lond., xv. p. 43.

MARION ISLAND. *Moseley.*

New Zealand; Cape Horn, Cape of Good Hope.

Ceramiaceæ.

Ballia callitricha, Mont.

Ballia callitricha, Mont. Syll. Gen. et Sp. Crypt., p. 444; Kütz., Sp. Alg., p. 663; Dickie in Journ. Linn. Soc. Lond., xv. p. 43.
Sphacelaria callitricha, K. A. Agardh, Sp. Alg., ii. p. 23.

Marion Island. *Moseley.*

All round the Southern Ocean.

"A bleached fragment of the same plant from a freshwater pool [on Marion Island], accidentally conveyed by birds (?), had on it a minute *Conferva* and a *Sphærozyga*, both too imperfect for recognition."—*Dickie.*

CHLOROSPERMEÆ.

Confervaceæ.

Chroolepus aureum, Kütz.

Chroolepus aureum, Kütz., Phyc. Gener., p. 284, et Sp. Alg., p. 426; Dickie in Journ. Linn. Soc. Lond., xv. p. 43.

Marion Island. *Moseley.*

All over Europe, and in most of the islands of the Southern Ocean, New Zealand, &c.

THE CROZETS.

INTRODUCTORY NOTES.

The natural history of this group of islands is still imperfectly known, but the few plants that have been collected are common to them and Marion, Kerguelen, and Heard Islands. Like Sir James Ross's Antarctic Expedition, the Challenger Expedition failed to make a landing, in consequence of the high sea and rough weather; and the little information obtained by the former was from some sealers, who boarded the "Terror" from Possession Island, while the Challenger was unable to approach the islands near enough to get more than an idea of their general aspect and configuration. The group consists of several contiguous islands, of which the principal are Possession, Hog, and East Islands, to which may be added Penguin, otherwise called Inaccessible. Possession Island is the largest; it is fifteen to twenty miles long, and about half as broad, and is situated in 47° S. latitude, and 77° 30′ E. longitude. The greatest altitude is estimated at 5000 feet.

Mr Moseley states[1] that the slopes on the eastern side of Possession Island appeared as if clothed with a vegetation similar to that of Marion Island, which, however, did not extend so high up in the mountains.

Eight plants only are known from these islands, six of which were collected by the officers of the United States ship "Monangahela" in Possession Island, and two by Captain J. N. East, of H.M.S. "Comus," who examined the Crozets in 1880 in order to ascertain if any shipwrecked people were there. He reported to the Secretary of the Admiralty, that the Kerguelen Cabbage (*Pringlea*) was abundant on Possession Island, and a plant called "red root," on which the pilot, who had spent some years in the islands, assured him human beings could not only exist but get fat. The plants he collected were fragments of two ferns: *Lomaria alpina*, and *Asplenium obtusatum*, which are in the Herbarium at Kew. There are also specimens of *Pringlea antiscorbutica* and *Azorella selago* in Kew Herbarium from the Crozets. They were sent alive by Mr J. M'Gibbon, superintendent of the Botanic Garden, Cape Town, who obtained them through the master of one of the vessels trading to the islands; but as they died on the passage to Kew, they were dried and preserved.

In addition to these eight plants, the Americans saw "a small vine, with blue flowers, growing among scoriæ," of which, however, they preserved no specimen. The sealers informed the officers of the Challenger Expedition that rabbits and hogs abounded in the islands, but the latter were not wholesome, because of their food.

For an analysis of the composition and affinities of the vegetation of this group, the introductory notes to the flora of Heard Island should be consulted (p. 244).

[1] Notes by a Naturalist on the Challenger, p. 182.]

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.

CRUCIFERÆ.

Pringlea antiscorbutica, R. Br.

Pringlea antiscorbutica, R. Br.; Hook. f., Fl. Antaret., p. 239, t. 90; Kidder in Bull. U.S. Nat. Mus., iii. p. 31.

Possession Island. *Captain J. N. East; United States Expedition.*

There is also a specimen in Kew Herbarium from the group, without any indication of the particular island on which it was gathered, from Mr M'Gibbon.

Prince Edward's group to Heard Island.

ROSACEÆ.

Acæna adscendens, Vahl.

Acæna adscendens, Vahl.; Hook. f., Fl. Antarct., p. 10, et p. 268, t. 96.
Acæna affinis, Hook. f., Fl. Antarct., p. 268, t. 96, B.; Oliv. in Journ. Linn. Soc. Lond., xiv. p. 389; Kidder in Bull. U.S. Nat. Mus., iii. p. 31.

Possession Island. *United States Expedition.*

Scattered all round the south temperate zone, and collected in Marion and Kerguelen Islands.

UMBELLIFERÆ.

Azorella selago, Hook. f.

Azorella selago, Hook. f., Fl. Antarct., p. 284, t. 99; Kidder in Bull. U.S. Nat. Mus., iii. p. 31.

Possession Island.—*United States Expedition;* from the group, without indication of the island—*M'Gibbon.*

Dispersed from Fuegia to Macquarie Island, particulars of which are given in the enumeration of the plants of the Prince Edward and Marion group.

RUBIACEÆ.

Galium antarcticum, Hook. f. (Plate XL.)

Galium antarcticum, Hook. f., Fl. Antarct., p. 303, *bis*; Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.
Galium trifidum, Linn.? D'Urv. in Mém. Soc. Linn. Par., iv. p. 612.

Possession Island. *United States Expedition.*

Fuegia, Falklands, and Kerguelen Island.

COMPOSITÆ.

Cotula plumosa, Hook. f.

Cotula plumosa, Hook. f., Handb. Fl. N. Zeal., p. 141, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 21.
Leptinella plumosa, Hook. f., Fl. Antarct., i. p. 26, t. 20, et ii. p. 308; Kidder in Bull. U.S. Nat. Mus., iii. p. 31.

Possession Island. *United States Expedition.*

Kerguelen, Lord Auckland, Campbell, and Macquarie Islands.

The statement in the Flora Antarctica (ii. p. 308) respecting the distribution of this plant should have been,—*not* found on the American continent.

CRYPTOGAMÆ.

FILICES.

Lomaria alpina, Spreng.

Lomaria alpina, Spreng., Syst. Veg., iv. p. 62; Hook. f., Fl. Antarct., p. 393, t. 150; Hook., Fil. Exot., t. 32; Hook. and Bak., Synop. Fil., p. 178.
Lomaria penna-marina, Mett., ex Kuhn, Fil. Afr., p. 92.

Possession Island. *Captain J. N. East*, 1880; *United States Expedition.*

Found in nearly all the islands and islets of the Southern Ocean. Fuller synonymy and further particulars of the distribution of this fern are given in the enumeration of the plants of the Tristan da Cunha group.

Asplenium obtusatum, Forst.

Asplenium obtusatum, Forst., Fl. Ins. Austr. Prodr., p. 80; Hook., Fil. Exot., t. 46; Hook. and Bak., Synop. Fil., p. 207.

Possession Island. *Captain J. N. East*, 1880.

Independently of the very distinct varieties *obliquum* and *lucidum*, this has a very wide range, extending all round the south temperate zone, including the Tristan da Cunha group as well as Pitcairn and Easter Islands, and, in places, northward into subtropical regions.

MUSCI.

Andreæa marginata, Hook. f. et Wils. ?

Andreæa marginata, Hook. f. et Wils., Fl. Antarct., p. 396, t. 151? ex Kidder in Bull. U.S. Nat. Mus., iii. p. 31.

Possession Island. *United States Expedition.*

The true *Andreæa marginata* has been collected on Hermit Island, Cape Horn, and Kerguelen Island; but the specimen collected by the United States Expedition was too imperfect to be determined with certainty.

KERGUELEN ISLAND.

THE flora of Kerguelen Island has so recently been exhaustively treated by Sir Joseph Hooker[1] and other botanists, that there is no necessity for an original investigation of it in this work. Still, this being the largest island of several, including Marion, the Crozets, and Heard, which have exactly the same kind of vegetation, it seems desirable to give an enumeration of the plants here, as well as a few particulars concerning the position, area, and aspect of the island. For the purposes of this work, the following extracts from Mr Moseley's account of the island will suffice.[2] It should be mentioned that Mr Moseley's collection was included by Sir Joseph Hooker in the above-cited elaboration of the flora. The composition and distribution of the elements of the Kerguelen flora are examined and briefly discussed in the ensuing account of the botany of Heard Island.

"Kerguelen Island, or Kerguelen's Land, extends from about lat. 48° 39′ S. to lat. 49° 44′ S. Its southernmost point is therefore in about corresponding latitude to the Lizard in Cornwall, which is a little below 50° N. In longitude, very roughly speaking, Kerguelen Island corresponds with the Island of Rodriguez, the Maldive Islands, Bombay, Tobolsk, and the mouth of the river Obi.

"The extreme length of the island is about eighty-five miles, and the extreme breadth seventy-nine miles; but the coast is so much indented by sounds or fjords, that the area of the island is not more than, very roughly, 2050 square miles, or about three times as great as that of Oxfordshire.

"The island lies within the belt of rain at all seasons of the year, and being reached by no drying winds, and its temperature being kept down by the surrounding vast expanse of sea, has its soil and vegetable covering permanently saturated with moisture. Further, with this fact of constant precipitation of moisture is connected the form of the island itself, since fjord formation is accomplished only by glaciation on a large scale, and this can only occur where there is a constant supply of snow. The island further lies within the line of the Antarctic drift, as do also the Crozets and Prince Edward group; and this cold current must reduce the temperature considerably. It is also within the region of prevailing westerly winds, the course of which is, in the Southern Ocean, untrammelled and undisturbed by barriers of land. Since the line of greatest length of the island lies in a north-west and south-east direction, and the coast-line, though much broken, trends on either side in the same direction, the north-east side is the sheltered one, and that, consequently, where are the safest anchorages, whilst the south-west side is the weather one.[3]

"Throughout, the island is mountainous, made up of a series of steep-sided valleys, separated by ridges and mountain masses, which rise to very considerable heights. Mount Ross, the highest, is

[1] *Philosophical Transactions of the Royal Society of London*, clxviii. pp. 5–93, tt. 1–5.

[2] Notes by a Naturalist on the Challenger, p. 184.

[3] For a brief summary of the climate of Kerguelen by the Rev. A. E. Eaton, see p. 244.

6120 feet in altitude; Mount Richards, 4000 feet; Mount Crozier, 3250; Mount Wyville Thomson, 3160; Mount Hooker, 2600; Mount Moseley, 2400. Therefore, when viewed from the sea at a distance, the island presents a remarkable jagged outline of sharp peaks, which is most strikingly observed from the south side. All the valleys run down to the sea, broadening out as they approach it; and the coast is broken up everywhere by deep sounds or fjords, which resemble closely in form the fjords of Norway, and of all other parts of the world where fjords exist. They are long channel-like excavations of the coast-line, occupied by arms of the sea, often shallower at the mouths than at the upper extremities, and bounded on either hand by perpendicular cliffs.

"Kerguelen is of volcanic formation as far as it has yet been investigated, and there is no doubt that it is entirely so formed, the beds of coal alone excepted, and certain beds of red earth, which are of the same origin as the coal, but merely different in that they have undergone a more intense heating. It has undergone immense denudation, and on its whole north-eastern and southern regions there is no trace of any volcanic cone or signs of comparatively modern volcanic action, as at Marion Island. Every appearance bespeaks considerable antiquity. Nevertheless, it seems to be certain that there exists towards the south-west of the island a still active volcano, with hot springs in its neighbourhood. We fell in with an American whaling captain, Captain Fuller, who has been often on the weather shore, and is well acquainted with the position of the volcano, and though he had not been actually at it himself, some of his men had; and in Tristan da Cunha we received independent testimony in the matter from old sealers.

"The appearance of the island in the region of the volcano must thus be very different from that of the north-eastern and south-eastern portions. As necessarily follows from the presence of fjords, the whole of the lower rock surface of the island shows most marked evidence of glaciation. Christmas Harbour, almost on the extreme north of the island, is a small example of one of the fjords. It is a deep inlet, with dark frowning cliffs on either hand at its entrance; the land on either side running out into long narrow promontories, which separate the harbour from another similar fjord on the south and from a bay on the north. The promontories thus formed are high, and bounded throughout almost their entire stretch by sheer precipices on either hand. On the north side only of Christmas Harbour, somewhat above its mouth, does the land rise in a steep, broken slope, which can be ascended directly from the sea.

"At the termination seawards of the southern promontory is the well-known arched rock of Christmas Harbour, a roughly rectangular, oblong mass, evidently formerly continuous directly with the rest of the promontory, but now separated from it, except at its very base, by a chasm, and perforated so as to form an arch. Above the high cliffs on the south side of the harbour towers up a huge and imposing mass of black-looking rock with perpendicular faces; this overhanging somewhat towards the harbour, from the weathering out of soft strata beneath it, looks as if it might fall some day and fill the upper part of the harbour. On the north side rises a flat-topped, rocky mass 1215 feet in height, called Table Mountain.

"At the head of the harbour is a sandy beach and small stretch of flat land, as exists at the heads of all the fjords; and beyond this the land rises in a series of steps, separated by short cliffs towards the bases of Table Mountain and the great rock on the south.

"The flat stretch of land at the head of Christmas Harbour is covered with a thick, rank growth of grass (*Festuca cookii*), and a composite herb with feathery leaves and yellow flower (*Cotula plumosa*), also with *Azorella*, as at Marion Island, with *Acæna*, *Montia fontana*, and *Callitriche verna* about the dampest places. The soil is black and peaty, and saturated with water. It is almost impossible to

find anything to burn; the *Azorella* is the only thing that will burn, and sometimes pieces of this may be found that are dry enough, in places where bunches of it overhang small precipices, and the water can thus drip away.

"The feature which distinguishes the general appearance of the vegetation of Christmas Harbour from that of Marion Island is the presence of the Kerguelen cabbage (*Pringlea antiscorbutica*) in large quantities. The plant grows on the slopes and bases of the cliffs in thick beds. The cabbage is in appearance like a small garden cabbage, but often with a long trailing stalk. It is, however, not annual but perennial, and the flowering stalks, instead of coming out from the centre of the head, come out laterally from the sides of the stalks between the leaves.

"The old flower-stalks die and wither, but do not drop off. I counted on one cabbage at Betsy Cove, twenty-eight flowering stalks of different ages, three of them only being of the current year's growth, and fresh. Altogether, they appeared to belong to eight successive years. About Christmas Harbour the cabbage was either in flower or green fruit, mostly the latter. It was only in the south of the island, about Royal Sound, that ripe seed was met with; but there, especially at Mutton Cove, it was abundant.

"Crawling about the heart of the cabbages, and sheltering there, were found swarms of the curious wingless fly, likewise peculiar to Kerguelen and the other islands where the cabbage grows. The fly (*Calycopteryx moseleyi*, Eaton) is simply a long-legged brown insect, with very minute rudimentary wings. It crawls about lazily on the cabbage, and lays its eggs in the moisture between the leaves, near the heart of the plant.

"Another fly (*Amalopteryx maritima*), with wings rudimentary but larger in proportion to the body than in the other, is found about the rocks on the sea-shore, where it jumps about when hunted, like a small grasshopper. It is the same as found at Marion Island, where it was discovered by von Willemoes Suhm. Probably the fly frequenting the cabbage also exists at Marion Island; but we did not know where to look for it when there, and cabbages were not very abundant; but it is possible, also, that it does not extend there, for we saw no teal on Marion Island, though they exist in abundance on the Crozets, and especially on Possession Island, where, as we were told by the sealers, there is a lake full of them. However, we examined but a very small tract of Marion Island, and similar tracts are to be found in Kerguelen Island, with very few cabbages and consequently without teal. Both animals may abound in parts of Marion Island not visited by us.

"A wingless gnat (*Halirytus amphibius*) also inhabits the sea-shore, living amongst the seaweed constantly wetted by the tide. I discovered at the Falkland Islands a similar wingless gnat, and a fly which I believe to be closely allied to the Kerguelen *Amalopteryx*, and which thus adds to those already known a further interesting link between the forms of life inhabiting these widely separated islands.

"I mounted up the slope towards Table Mountain. The climb is up a succession of steps, the successive flat ledges presenting glaciated surfaces scattered over with stones fallen from above. The thick rank vegetation ceases at about 300 feet altitude, and then becomes more sparse. *Colobanthus kerguelensis*, a plant peculiar to Kerguelen and Heard Islands, affects the more barren stony ground at this elevation, and I did not meet with it anywhere about the lower slopes, or amongst the peaty soil. On Heard Island it grows at the sea-level.

"At about 500 feet elevation, a very handsome lichen (*Neuropogon taylori*) commences rather abruptly. It is very conspicuous, being of a mingled bright sulphur-yellow and black colour, and of large size. This lichen is abundant on the higher rocks everywhere. *Azorella* and *Pringlea* grow

up to about 1000 feet, the height of the ridge from which the rocky mass forming the top of Table Mountain rises. Here *Pringlea* ceases, but *Azorella* is continued in very small quantities to the top of the mountain, growing on its very summit, but only in sheltered corners between rocks, and there much dwarfed.

"*Azorella*, *Pringlea*, and a grass (*Agrostis magellanica*) were the only flowering plants at 1000 feet, and these were only very sparsely represented. The land at this height presented a series of ridges of barren rock and piles of stones. At Mutton Cove and about Royal Sound, a very marked line, at about 1000 feet, separates the green lower slopes from the barren stony ridges and peaks above. It is probably the line above which snow lies for the greater part of the year unmelted, though the hills just above it, at Mutton Cove, were quite free from snow at the time of our visit.

"In a pool of water, on the summit of Table Mountain, I found a quantity of specimens of a small *Lumbriculus*, or allied form of Annelid. The phonolith of which Table Mountain is composed is full of olivine crystals, occurring in large rounded masses as in the Ardêche valley, and many other volcanic districts.

"A comparatively low ridge separates the head of Christmas Harbour from the sea directly beyond. On a flat expanse of this ridge are two small freshwater lakes, in which grow two water plants, *Limosella aquatica* and *Nitella antarctica*, both widely spread plants.

"I found *Limosella aquatica* only in these particular lakes, and then only after a very long search, since it resembles extremely closely, in its general appearance when growing in masses, *Ranunculus moseleyi*, which grows with it in the water.

"Above the lakes the ridge rises somewhat, and then terminates in an inaccessible precipice fronting the sea, with short talus slopes below, on which are rookeries of crested penguins. Under the peculiar overhanging rock on the south of the harbour are beds of fossil wood, and the excavation beneath its base is hence called Fossilwood Cave. The wood occurs in beds lying nearly horizontal, and a few feet only in thickness."

ENUMERATION OF THE PLANTS.[1]

PHANEROGAMÆ.

RANUNCULACEÆ.

Ranunculus crassipes,[2] Hook. f.

Ranunculus crassipes, Hook. f., Fl. Antarct., p. 224, t. 81, et in Phil. Trans. Roy. Soc. Lond., clxviii p. 17.

KERGUELEN ISLAND.—Christmas Harbour, Observatory, and Swain's Bay, Royal Sound.

Ranunculus trullifolius, Hook. f.

Ranunculus trullifolius, Hook. f., Fl. Antarct., p. 226, t. 82, A., et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 17, t. 1.

KERGUELEN ISLAND.—In streamlets and lakes, Royal Sound, Swain's Bay, Betsy Cove.

Ranunculus moseleyi, Hook. f.

Ranunculus moseleyi, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 18, t. 2, fig. 1.

KERGUELEN ISLAND.—In the lake at Christmas Harbour.

CRUCIFERÆ.

Pringlea antiscorbutica, R. Br.

Pringlea antiscorbutica, R. Br.; Hook. f., Fl. Antarct., p. 238, t. 90, 91; Kidder in Bull. U.S. Nat. Mus., No. 321; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389; Dyer in Proc. Linn. Soc. Lond. 1874, xxxiv.; Hook. f., in Phil. Trans. Roy. Soc. Lond., clxviii. p. 18, t. 2, fig. 3.

KERGUELEN ISLAND.—Throughout the island.

[1] Restricted to a list, with the necessary references, and the distribution within the island, extracted from Sir Joseph Hooker's paper on the botany of the island (*Phil. Trans. Roy. Soc. Lond.*, clxviii.), where the various collectors are enumerated. Particulars of the general distribution of the vascular plants will be found in a tabular form in the Report on the Botany of Heard Island (p. 244).

[2] Although the original specimens of this are very distinct from the ordinary *Ranunculus biternatus*, intermediate forms have been collected, and we have authority for saying that Sir Joseph Hooker would now give it the rank of a variety rather than an independent species.

CARYOPHYLLEÆ.

Colobanthus kerguelensis, Hook. f.

Colobanthus kerguelensis, Hook. f., Fl. Antarct., p. 249, t. 92, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 19.

KERGUELEN ISLAND.—Christmas Harbour, Swain's Bay, &c.

Lyallia kerguelensis, Hook. f.

Lyallia kerguelensis, Hook. f., Fl. Antarct., p. 548, t. 122; Kidder in Bull. U.S. Nat. Mus., No. 3, p. 22; Oliver in Journ. Linn. Soc. Lond., xiv. p. 390; Dyer in Proc. Linn. Soc. Lond., 1874, xxxiv.*; Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 19, t. 2, fig. 2.

KERGUELEN ISLAND.—Christmas Harbour and Royal Sound.

PORTULACEÆ.

Montia fontana, Linn.

Montia fontana, Linn.; Hook. f., Fl. Antarct., p. 278, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.

KERGUELEN ISLAND.—Common in wet places.

ROSACEÆ.

Acæna adscendens, Vahl.

Acæna adscendens, Vahl, Enum. Pl., i. p. 297; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389.
Acæna affinis, Hook. f., Fl. Antarct., p. 268, t. 96, B., et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.

KERGUELEN ISLAND.—Common throughout the island.

HALORAGEÆ.

Callitriche verna, Linn., subsp. *obtusangula*, Hook. f.

Callitriche verna, Linn., subsp. *obtusangula*, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.
Callitriche obtusangula, Le Gall.; Hegelm., Monog. Gatt. Callit., p. 54.
Callitriche antarctica, Engelm. ex Hegelm. l. c.; Kidder in Bull. U.S. Nat. Mus., No. 3, p. 23.
Callitriche verna, Hook. f., Fl. Antarct., p. 272.

KERGUELEN ISLAND.—Common in wet places.

CRASSULACEÆ.

Tillæa moschata, DC.

Tillæa moschata, DC.; Hook. f., Handb. Fl. N. Zeal., p. 61, et in Phil. Trans. Roy. Soc. Lond. clxviii. p. 20; Hook., Ic. Pl., t. 535.
Bulliarda moschata, D'Urv. in Mém. Soc. Linn. Par., iv. p. 618.
Bulliarda magellanica, DC. in Bull. Philom., n. 49.
Crassula moschata, Forst. in Comm. Soc. Gœtt., ix. p. 26 (reprint, p. 16).

KERGUELEN ISLAND.—Abundant in moist places near the sea.

UMBELLIFERÆ.

Azorella selago, Hook. f.

Azorella selago, Hook. f., Fl. Antarct., p. 284, t. 99, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.

KERGUELEN ISLAND.—Very abundant throughout the island.

RUBIACEÆ.

Galium antarcticum, Hook. f. (Plate XL.)

Galium antarcticum, Hook. f., Fl. Antarct., p. 303 *bis*, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.

KERGUELEN ISLAND.—Common, but not found at Christmas Harbour.

COMPOSITÆ.

Cotula (Leptinella) plumosa, Hook.

Cotula (Leptinella) plumosa, Hook. f., Fl. Antarct., p. 26 et 308, t. 20, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 21.

KERGUELEN ISLAND.—On cliffs, especially near the sea, often forming immense luxuriant blue-green patches where the soil is enriched by the dung of birds and seals.

SCROPHULARINEÆ.

Limosella aquatica, Linn.

Limosella aquatica, Linn.; Hook. f., Handb. Fl. N. Zeal., p. 204, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 21.

KERGUELEN ISLAND.—Common in the freshwater lagoon at Christmas Harbour.

JUNCACEÆ.

Juncus scheuchzerioides, La Harpe.

Juncus scheuchzerioides, La Harpe, ex Gaud. in Ann. Sc. Nat., v. p. 100; Hook. f., Fl. Antarct., pp. 79, 358, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 21.

KERGUELEN ISLAND.—Common in spongy places.

CYPERACEÆ.

Uncinia compacta, R. Br.

Uncinia compacta, R. Br.; Boott in Hook. f. Fl. Tasman., ii. p. 103, t. 153, B.; Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 21.
Uncinia moseleyana, Bœckel. in Flora, 1878, p. 170.

KERGUELEN ISLAND.—Royal Sound and Observatory Bay.

GRAMINEÆ.

Deschampsia antarctica, Hook.

Deschampsia antarctica, Hook., Ic. Pl., t. 150 (*Aira*); Hook. f., Fl. Antarct., p. 377, t. 133, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 21.

KERGUELEN ISLAND.—Common, and ascending to considerable altitudes.

Agrostis magellanica, Lamk.

Agrostis magellanica, Lamk.; Hook. f., Fl. Antarct., p. 373, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 21.
Agrostis antarctica, Hook. f., Fl. Antarct., p. 373, t. 132.
Agrostis multicaulis, Hook. f., Fl. Antarct., p. 95.

KERGUELEN ISLAND.—Common throughout the island.

Poa cookii, Hook. f.

Poa cookii, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 22.
Festuca cookii, Hook. f., Fl. Antarct., p. 382, t. 139.

KERGUELEN ISLAND.—Abundant, and ascending to a considerable height. Christmas Harbour, Royal Sound, on a hill.

Festuca erecta, D'Urv.

Festuca erecta, D'Urv.; Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 22.

KERGUELEN ISLAND.—Common, and ascending to a considerable elevation.

Festuca kerguelensis, Hook. f.

Festuca kerguelensis, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 22.
Triodia kerguelensis, Hook. f., Fl. Antarct., p. 379.
Poa kerguelensis, Hook. f., Fl. Antarct., t. 138.

KERGUELEN ISLAND.—Common, and ascending to 2000 feet.

CRYPTOGAMÆ.

FILICES.

Cystopteris fragilis, Bernh.

Cystopteris fragilis, Bernh.; Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 22.

KERGUELEN ISLAND.—Crevices of rocks near the hill-tops, Royal Sound.

Lomaria alpina, Spreng.

Lomaria alpina, Spreng.; Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 23.

KERGUELEN ISLAND.—Common; often forming large beds, but not found at Christmas Harbour.

Polypodium (Grammitis) australe, Mett.

Polypodium (Grammitis) australe, Mett.; Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 23.

KERGUELEN ISLAND.—Crevices of rocks, Observatory Bay.

Polypodium vulgare, Linn., var. *eatoni*.

Polypodium vulgare, Linn. var. *eatoni*, Baker, *venis pellucidis*, in Phil. Trans. Roy. Soc. Lond., clxviii. p. 23.

KERGUELEN ISLAND.—Crevices of rocks by running streams, Observatory Bay.

LYCOPODIACEÆ.

Lycopodium saururus, Lam.

Lycopodium saururus, Lam.; Spring, Monogr. Lycopod., partie i. p. 21.

Lycopodium selago, Linn., var. *saururus*, Hook. f., Fl. Antarct., p. 394, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 23.

KERGUELEN ISLAND.—Not uncommon throughout the island.

Lycopodium clavatum, Linn., var. *magellanicum*.

Lycopodium clavatum, Linn., var. *magellanicum*, Hook. f., Fl. Antarct., p. 113, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 23.

Lycopodium magellanicum, Swartz.

KERGUELEN ISLAND.—Not uncommon throughout the island, but not met with at Christmas Harbour.

MUSCI.

Ditrichium australe, Mitt.

Ditrichium australe, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 25.

Cynontodium australe, Mitt. in Journ. Linn. Soc. Lond., xii. p. 42.

Lophiodon strictus, Hook. f. et Wils., Fl. Antarct., p. 130, t. 59, fig. 1.

KERGUELEN ISLAND.

Ditrichium hookeri, Mitt.

Ditrichium hookeri, Mitt. in Phil. Trans. Roy. Soc. Lond. clxviii. p. 25.

Leptotrichum hookeri, C. Müll., Synop. Musc. Frond., i. p. 450.

KERGUELEN ISLAND.

Ditrichium conicum, Mitt.

Ditrichium conicum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 25.

Aschistodon conicum, Mont. in Ann. Sc. Nat., sér. 3, iv. p. 100.

KERGUELEN ISLAND.

Asiothecium vaginatum, Mitt.

Asiothecium vaginatum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 25.

Dicranum vaginatum, Hook., Musc. Exot., t. 141.

KERGUELEN ISLAND.

Blindia gracillima, Mitt.

Blindia gracillima, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 26.
Blindia curviseta, Mitt. in Journ. Linn. Soc. Lond., xv. p. 193.

KERGUELEN ISLAND.

Blindia microcarpa, Mitt.

Blindia microcarpa, Mitt. in Journ. Linn. Soc. Lond., xv. p. 65, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 26.

KERGUELEN ISLAND.

Blindia contecta, Mitt.

Blindia contecta, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 27.
Weisia contecta, Hook. f. et Wils., Fl. Antarct., p. 404, t. 58, f. 3.

KERGUELEN ISLAND.

Dicranum (Isocarpus) tortifolium, Mitt.

Dicranum (Isocarpus) tortifolium, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 28.
Weisia tortifolia, Hook. f. et Wils., Fl. Antarct., p. 404, t. 152, f. 5.

KERGUELEN ISLAND.

Dicranum (Isocarpus) strictum, Mitt.

Dicranum (Isocarpus) strictum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 28.
Weisia stricta, Hook. f. et Wils., Fl. Antarct., p. 404, t. 152, f. 4.

KERGUELEN ISLAND.

Dicranum (Hemicampylus) robustum, Mitt.

Dicranum (Hemicampylus) robustum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 28.
Dicranum robustum, var. *lucidum*, Hook. f. et Wils., Fl. Antarct., p. 406, t. 152, f. 8.
Dicranum pungens, var. *lucidum*, Hook. f. et Wils., Fl. Antarct., p. 129, t. 59, f. 1.

KERGUELEN ISLAND.

Dicranum (Hemicampylus) kerguelense, C. Müll.

Dicranum (Hemicampylus) kerguelense, C. Müll., Synop. Musc. Frond., i. p. 370; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 28.
Dicranum coryanum, Schwægr.; Hook. f. et Wils., Fl. Antarct., p. 406.
Cecalyphum dichotomum, Beauv., Prodr., p. 51.

KERGUELEN ISLAND.

Campylopus cavifolius, Mitt.

Campylopus cavifolius, Mitt. in Journ. Linn. Soc. Lond., xii. p. 87, et in Phil. Trans. Roy. Soc. Lond., cxlviii. p. 29.

KERGUELEN ISLAND.

Ceratodon purpureus, Brid.

Ceratodon purpureus, Brid.; Müll., Synop. Musc. Frond., i. p. 646; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 29.

KERGUELEN ISLAND.

Grimmia (Schistidium) apocarpa, Mitt.

Grimmia (*Schistidium*) *apocarpa*, Linn., Sp. Pl., ed. 2, 1579 (*Bryum*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 29.

KERGUELEN ISLAND.

Grimmia (Schistidium) falcata, Hook. f. et Wils.

Grimmia (*Schistidium*) *falcata*, Hook. f. et Wils., Fl. Antarct., p. 401, t. 151, f. 8; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 29.

KERGUELEN ISLAND.

Grimmia insularis, Mitt.

Grimmia insularis, Mitt. in Journ. Linn. Soc. Lond., xv. p. 73, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 29.

KERGUELEN ISLAND.

Grimmia (Eugrimmia) kidderi, James.

Grimmia (*Eugrimmia*) *kidderi*, James in Bull. U.S. Nat. Mus., iii. p. 25; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 29.

KERGUELEN ISLAND.

Grimmia (Dryptodon) chlorocarpa, Brid.

Grimmia (*Dryptodon*) *chlorocarpa*, Brid.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 29.
Racomitrium crispulum, Mitt. in Hook. f. Handb. Fl. N. Zeal., ii. p. 426.

KERGUELEN ISLAND.

Grimmia (Dryptodon) crispulus, Hook. f. et Wils.

Grimmia (*Dryptodon*) *crispulus*, Hook. f. et Wils., Fl. Antarct., pp. 124 et 402, t. 57, f. 9; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 30.

KERGUELEN ISLAND.

Grimmia (Racomitrium) lanuginosa, Mitt.

Grimmia (*Racomitrium*) *lanuginosa*, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 30.

KERGUELEN ISLAND.

Grimmia (Racomitrium) protensum, A. Braun:

Grimmia (Racomitrium) protensum, A. Braun; Hook. f. et Wils., Fl. Antarct., p. 402; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 30.

KERGUELEN ISLAND.

Grimmia frondosa, James.

Grimmia frondosa, James in Bull. U.S. Nat. Mus., iii. p. 25; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 30.

KERGUELEN ISLAND.

Orthotrichum crassifolium, Hook. f. et Wils.

Orthotrichum crassifolium, Hook. f. et Wils., Fl. Antarct., p. 125, t. 57, f. 8; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 30.

KERGUELEN ISLAND.

Orthotrichum atratum, Mitt.

Orthotrichum atratum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 66, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 30.

KERGUELEN ISLAND.

Orthotrichum rupestre, Schleich.

Orthotrichum rupestre, Schleich.; Brid., Sp. Musc., i. p. 279; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 31.

KERGUELEN ISLAND.

Zygodon brownii, Schwægr.

Zygodon brownii, Schwægr., Suppl., iv. t. 317, B.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 31.

KERGUELEN ISLAND.

Tortula (Syntrichia) princeps, De Notaris.

Tortula (Syntrichia) princeps, De Notaris; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 31.
*Barbula müller*i, Bruch et Schimp., Bryol. Europ., t. 28.
Tortula fuegiana, Mitt. in Journ. Linn. Soc. Lond., xv. p. 174.
Barbula (Syntrichia) magellanica, C. Müll. in Bot. Zeit., 1862, p. 349.
Barbula antarctica, Hampe in C. Müll. Synop. Musc. Frond., i. p. 638.
Tortula antarctica, *Tortula cuspidata*, et *Tortula rubella*, Hook. f. et Wils., Fl. Tasman., t. 172, figs. 8–10.

KERGUELEN ISLAND.

Tortula (Barbula) serrulata, Hook. et Grev.

Tortula (Barbula) serrulata, Hook. et Grev. in Brewst. Edinb. Journ., i. p. 291, t. 12; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 32.

KERGUELEN ISLAND.

Tortula (Barbula) erubescens, Mitt.

Tortula (Barbula) erubescens, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 32.
Didymodon erubescens, Mitt. in Hook. f. Handb. Fl. N. Zeal., ii. p. 421.

KERGUELEN ISLAND.

Streptopogon australis, Mitt.

Streptopogon australis, Mitt. in Journ. Linn. Soc. Lond., xv. p. 66, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 32.

KERGUELEN ISLAND.

Streptopogon? marginatus, Mitt.

Streptopogon? marginatus, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 33.
Schistidium marginatum, Hook. f. et Wils., Fl. Antarct., p. 399, t. 151, f. 6.

KERGUELEN ISLAND.

Entosthodon laxus, Mitt.

Entosthodon laxus, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.
Physcomitrium laxum, Hook. f. et Wils., Fl. Antarct., p. 399, t. 151, f. 5.

KERGUELEN ISLAND.

Bartramia (Philonotis) appressa, Hook. f. et Wils.

Bartramia (Philonotis) appressa, Hook. f. et Wils., Fl. N. Zeal., ii. p. 89, t. 86, f. 5; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bartramia (Philonotis) australis, Mitt.

Bartramia (Philonotis) australis, Mitt. in Hook. f. Handb. Fl. N. Zeal., p. 448, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bartramia (Breutelia) pendula, Hook.

Bartramia (Breutelia) pendula, Hook., Musc. Exot., t. 21; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bartramia (Eubartramia) patens, Brid.

Bartramia (Eubartramia) patens, Brid., Sp. Musc., iii. p. 82; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bartramia (Eubartramia) robusta, Hook. f. et Wils.

Bartramia (Eubartramia) robusta, Hook. f. et Wils., Fl. Antarct., t. 59; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bartramia flavicans, Mitt.

Bartramia flavicans, Mitt.; James in Bull. U.S. Nat. Mus., iii. p. 26; Hook., Kew Journ., 1855, p. 55; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bryum (Webera) nutans, Schreb.

Bryum (Webera) nutans, Schreb.; Hedw., Musc. Frond., i. t. 4; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bryum (Webera) elongatum, Dicks.

Bryum (Webera) elongatum, Dicks., fide Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bryum (Webera) crudum, Mitt.

Bryum (Webera) crudum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.
Mnium crudum, Hedw., Musc. Frond., i. t. 88.

KERGUELEN ISLAND.

Bryum (Webera) albicans, Wahlenb.

Bryum (Webera) albicans, Wahlenb.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bryum (Eccremothecium) pendulum, Hornsch.

Bryum (Eccremothecium) pendulum, Hornsch.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 34.

KERGUELEN ISLAND.

Bryum (Eccremothecium) eatoni, Mitt.

Bryum (Eccremothecium) eatoni, Mitt. in Journ. Linn. Soc. Lond., xv. p. 195, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 35.

KERGUELEN ISLAND.

Bryum (Eccremothecium) bimum, Schreb.

Bryum (Eccremothecium) bimum, Schreb.; Bryol. Europ., t. 21; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 35.

KERGUELEN ISLAND.

Bryum (Eccremothecium) alpinum, Linn.

Bryum (Eccremothecium) alpinum, Linn.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 35.

KERGUELEN ISLAND.

Bryum (Eccremothecium) argenteum, Linn.

Bryum (Eccremothecium) argenteum, Linn.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 35.

KERGUELEN ISLAND.

Bryum (Eccremothecium) kerguelense, Mitt.

Bryum (Eccremothecium) kerguelense, Mitt. in Journ. Linn. Soc. Lond., xv. p. 67, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 35.

KERGUELEN ISLAND.

Bryum lævigatum, var. β, Hook. f. et Wils.

Bryum lævigatum, var. β, Hook. f. et Wils., Fl. Antarct., p. 415, t. 154, f. 3; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.

KERGUELEN ISLAND.

Bryum wahlenbergii, Schwæg.

Bryum wahlenbergii, Schwæg., Suppl., i., ii. p. 92, t. 70; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.

KERGUELEN ISLAND.

Bryum warneum, Bland.

Bryum warneum, Bland.; James in Bull. U.S. Nat. Mus., iii. p. 26; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.

KERGUELEN ISLAND.

Bryum gayanum, Mont.

Bryum gayanum, Mont.; James in Bull. U.S. Nat. Mus., iii. p. 26; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.

KERGUELEN ISLAND.

Bryum torquescens, Bruch. et Schimp.

Bryum torquescens, Bruch. et Schimp.; James in Bull. U.S. Nat. Mus., iii. p. 26; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.

KERGUELEN ISLAND.

Bryum pallescens, Schwæg.

Bryum pallescens, Schwæg.; James in Bull. U.S. Nat. Mus., iii. p. 26; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.

KERGUELEN ISLAND.

Mielichhoferia campylocarpa, Mitt.

Mielichhoferia campylocarpa, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.
Weisia campylocarpa, Hook. et Arn. in Hook. Ic. Pl., t. 136.

KERGUELEN ISLAND.

Plagiothecium antarcticum, Mitt.

Plagiothecium antarcticum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 71, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 36.

KERGUELEN ISLAND.

Plagiothecium donianum, Sm.

Plagiothecium donianum, Sm.; James in Bull. U.S. Nat. Mus., iii., p. 26; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 37.

KERGUELEN ISLAND.

Acrocladium politum, Mitt.

Acrocladium politum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 531, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 37.
Hypnum politum, Hook. f. et Wils., Fl. Antarct., ii. t. 154, f. 2.

KERGUELEN ISLAND.

Stereodon cupressiformis, Linn. (*Hypnum*).

Stereodon cupressiformis, Linn. (*Hypnum*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 37.

KERGUELEN ISLAND.

Amblystegium uncinatum, Hedw.

Amblystegium uncinatum, Hedw. (*Hypnum*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 37.

KERGUELEN ISLAND.

Amblystegium fluitans, Linn.

Amblystegium fluitans, Linn. (*Hypnum*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 37.

KERGUELEN ISLAND.

Amblystegium riparium, Linn.

Amblystegium riparium, Linn. (*Hypnum*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 37.

KERGUELEN ISLAND.

Amblystegium kerguelense, Mitt.

Amblystegium kerguelense, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 37.

KERGUELEN ISLAND.

Amblystegium decussatum, Mitt.

Amblystegium decussatum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 38.
Hypnum decussatum, Hook. f. et Wils., Fl. N. Zeal., ii. t. 90, f. 2.

KERGUELEN ISLAND.

Sciaromium conspissatum, Mitt.

Sciaromium conspissatum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 572, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 38.
Hypnum conspissatum, Hook. f. et Wils., Fl. Antarct., p. 419, t. 155, f. 3.

KERGUELEN ISLAND.

Brachythecium subpilosum, Mitt.

Brachythecium subpilosum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 38.
Hypnum subpilosum, Hook. f. et Wils., Fl. Antarct., p. 418, t. 154, f. 4.

KERGUELEN ISLAND.

Brachythecium salebrosum, Hoffm. (*Hypnum*).

Brachythecium salebrosum, Hoffm. (*Hypnum*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 38.
Hypnum rutabulum, var. 4, Hook. f. et Wils., Fl. Antarct., p. 417.

KERGUELEN ISLAND.

Brachythecium paradoxum, Mitt.

Brachythecium paradoxum, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 39.
Hypnum paradoxum, Hook. f. et Wils., Fl. Antarct., p. 449, t. 155, f. 2; Hook. f., Handb. Fl. N. Zeal., p. 479.

KERGUELEN ISLAND.

Psilopilum trichodon, Mitt.

Psilopilum trichodon, Mitt. in Journ. Linn. Soc. Lond., xii. p. 607, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 39.
Polytrichum trichodon, Hook. et Wils. in Hook. Lond. Journ. Bot., 1847, p. 290.

KERGUELEN ISLAND.

Pogonatum alpinum, Brid.

Pogonatum alpinum, Brid., Bryol. Univ., ii. p. 129; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 39.

KERGUELEN ISLAND.

Catharina (Atrichum) compressa, C. Müll.

Catharina (Atrichum) compressa, C. Müll., Synop. Musc. Frond., i. p. 95; James in Bull. U.S. Nat. Mus., iii. p. 26; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 39.
Polytrichum compressum, Hook. f. et Wils., Fl. Antarct., p. 410, t. 153, f. 8.

KERGUELEN ISLAND.

Andreæa acuminata, Mitt.

Andræa acuminata, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 39.
Andræa acutifolia, var. γ, Hook. f. et Wils., Fl. Antarct., p. 396.

KERGUELEN ISLAND.

Andreæa squarrosa, Mitt.

Andræa squarrosa, Mitt. in Journ. Linn. Soc. Lond., xii. p. 629, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 39.
Andræa alpina, var. 1, Hook. f. et Wils., Fl. Antarct., p. 395.

KERGUELEN ISLAND.

Andreæa marginata, Hook. f. et Wils.

Andræa marginata, Hook. f. et Wils., Fl. Antarct., p. 396, t. 151, f. 1; James in Bull. U.S. Nat. Mus iii. p. 25; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 39.

KERGUELEN ISLAND.

Since the appearance of the Botany of Kerguelen Island, in which Mr Mitten described or enumerated all the mosses collected by the naturalists of the various English expeditions, Dr Karl Mueller has published in Engler's Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie, 1884, pp. 76–88, short diagnoses of what he regards as new species of mosses collected by Dr Naumann of the German "Gazelle" Expedition. The following is a list of eighty proposed new species from the island of Kerguelen:—

Andreæa subappendiculata, Andreæa aterrima, Andreæa parallela, Andreæa naumanni, Andreæa flabellata, Andreæa nana, Andreæa squamata, Entosthodon antarcticus, Catharinea (*Psilopilum*) *antarctica, Polytrichum* (*Eupolytrichum*) *microcephalum, Polytrichum* (*Eupolytrichum*) *tuberculosum, Polytrichum* (*Pogonatum?*) *austro-alpinum, Mielochhoferia kerguelensis, Bryum* (*Eubryum*) *pymæum, Bryum* (*Eubryum*) *micro-lævigatum, Bryum* (*Eubryum*) *splachnoideum, Bryum* (*Eubryum*) *austro-cespiticium, Bryum* (*Eubryum*) *gemmaceolum, Bryum* (*Eubryum*) *robustulum, Bryum* (*Eubryum*) *macrantherum, Bryum* (*Eubryum*) *validinervium, Bryum* (*Eubryum*) *orthotheciellæ, Bryum* (*Senodictyon*) *austro-albicans, Bryum* (*Senodictyon*) *austro-crudum, Bryum* (*Senodictyon*) *austro-elongatum, Bryum* (*Senodictyon*) *austro-nutans, Bryum* (*Senodictyon*) *austro-polymorphum, Bryum* (*Senodictyon*) *aptychoides, Blindia aschistodontoides, Blindia tortelloides, Blindia dryptodontoides, Blindia pulvinata, Dicranum* (*Oncophorus*) *arctoæoides, Bartramia* (*Eubartramia*) *chrysura, Bartramia* (*Vaginella*) *diminutiva, Bartramia* (*Philonotis*) *graminicola, Bartramia* (*Philonotis*) *anisothecioides, Bartramia* (*Philonotis*) *polymorpha, Bartramia* (*Philonotula*) *subexigua, Pottia* (*Eupottia*) *fusco mucronata, Pottia* (*Eupottia*) *naumanni, Pottia* (*Eupottia*) *œdipodioides, Barbula* (*Senophyllum*) *validinervia, Barbula* (*Syntrichia*) *geheebiæopsis, Barbula* (*Syntrichia*) *semirubra, Barbula* (*Syntrichia*) *hyalinotricha, Barbula* (*Syntrichia*) *calobolax, Trichostomum*

(*Eutrichostomum*) *austro-alpigenum*, *Orthotrichum* (*Euorthotrichum*) *rupicolum*, *Orthotrichum* (*Ulota*) *phyllantoides*, *Grimmia* (*Platystoma*) *chrysoneura*, *Grimmia* (*Platystoma*) *stylostegia*, *Grimmia* (*Platystoma*) *cupularis*, *Grimmia* (*Platystoma*) *serratomucronata*, *Grimmia* (*Eugrimmia*) *minutifolia*, *Grimmia* (*Eugrimmia*) *rufa*, *Grimmia* (*Eugrimmia*) *pulvinatula*, *Grimmia* (*Eugrimmia*) *stolonifera*, *Grimmia* (*Dryptodon*) *aterrima*, *Grimmia* (*Dryptodon*) *zygodonticaulis*, *Grimmia* (*Dryptodon*) *defoliata*, *Grimmia* (*Dryptodon*) *genuflexa*, *Grimmia* (*Dryptodon*) *orthotrichacea*, *Grimmia* (*Dryptodon*) *suborthotrichacea*, *Grimmia* (*Dryptodon*) *ochracea*, *Grimmia* (*Dryptodon*) *minuta*, *Grimmia* (*Rhacomitrium*) *chrysoblasta*, *Dichelyma* (*Eudichelyma*) *antarcticum*, *Hypnum* (*Brachythecium*) *austro-salebrosum*, *Hypnum* (*Brachythecium*) *austro-glareosum*, *Hypnum* (*Brachythecium*) *euryodictyon*, *Hypnum* (*Drepanocladus*) *austro-aduncum*, *Hypnum* (*Drepanocladus*) *austro-uncinatum*, *Hypnum* (*Drepanocladus*) *austro-fluitans*, *Hypnum* (*Drepanocladus*) *fontinaliopsis*, *Hypnum* (*Plagiothecium*) *austro-pulchellum*, *Hypnum* (*Pseudoleskea*) *chalarocladum*, *Hypnum* (*Pseudoleskea*) *desmiocladum*, *Hypnum* (*Orthotheciella*) *filum*, *Hypnum* (*Orthotheciella*) *austro-catenulatum*.

HEPATICÆ.

Plagiochila heterodonta, Hook. f. et Tayl.[1]

Plagiochila heterodonta, Hook. f. et Tayl., Fl. Antarct., p. 428, t. 157, f. 2; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 40.

KERGUELEN ISLAND.

Plagiochila minutula, Hook. f. et Tayl.

Plagiochila minutula, Hook. f. et Tayl., Fl. Antarct., p. 427, t. 157, f. 1; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 40.

KERGUELEN ISLAND.

Leioscyphus turgescens, Hook. f. et Tayl.

Leioscyphus turgescens, Hook. f. et Tayl., Fl. Antarct., p. 150, t. 64, f. 2; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 40.

KERGUELEN ISLAND.

Leioscyphus pallens, Mitt.

Leioscyphus pallens, Mitt. in Journ. Linn. Soc. Lond., xv. p. 68, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 40.

KERGUELEN ISLAND.

Lophocolea pallidovirens, Hook. f. et Tayl.

Lophocolea pallidovirens, Hook. f. et Tayl., Fl. Antarct., p. 439, t. 159, f. 9; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 41.

KERGUELEN ISLAND.

[1] Many of the names cited by Mitten as generic are only employed as sectional names of the genus *Jungermannia*, by Hook. f. and Wils.

Lophocolea novæ-zealandiæ, Lehm. et Lindenb. (*Jungermannia*).

Lophocolea novæ-zealandiæ, Lehm. et Lindenb. (*Jungermannia*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 41.

KERGUELEN ISLAND.

Lophocolea humifusa, Hook. f. et Tayl.

Lophocolea humifusa, Hook. f. et Tayl., Fl. Antarct., p. 436, t. 159, f. 5; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 41.

KERGUELEN ISLAND.

Teinnoma quadripartita, Mitt.

Teinnoma quadripartita, Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 41.
Jungermannia quadripartita, Hook., Musc. Exot., t. 117.

KERGUELEN ISLAND.

Jungermannia cylindriformis, Mitt.

Jungermannia cylindriformis, Mitt. in Journ. Linn. Soc. Lond., xv. p. 196, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 41.

KERGUELEN ISLAND.

Jungermannia leucorhiza, Mitt.

Jungermannia leucorhiza, Mitt. in Journ. Linn. Soc. Lond., xv. p. 68, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 42.

KERGUELEN ISLAND.

Jungermannia colorata, Lehm. et Lindenb.

Jungermannia colorata, Lehm. et Lindenb.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 42.

KERGUELEN ISLAND.

Solenostoma humilis, Hook. f. et Tayl.

Solenostoma humilis, Hook. f. et Tayl., Fl. Antarct., p. 434, t. 158, f. 6 (*Jungermannia*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 42.
Jungermannia inundata, Hook. f., Fl. N. Zeal., p. 128, t. 93, f. 3.

KERGUELEN ISLAND.

Scapania densifolia, Hook.

Scapania densifolia, Hook., Musc. Exot., t. 36 (*Jungermannia*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 42.

KERGUELEN ISLAND.

Scapania clandestina, Mont.

Scapania clandestina, Mont., Bot. Crypt. Astrolabe, t. 16, f. 4; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 43.

Balantiopsis incrassata, Mitt. in Journ. Linn. Soc. Lond., xv. p. 197.

KERGUELEN ISLAND.

Gymnomitrium atrocapillum, Hook. f. et Tayl.

Gymnomitrium atrocapillum, Hook. f. et Tayl., Fl. Antarct., p. 423; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 43.

KERGUELEN ISLAND.

Lembidium ventrosum, Mitt.

Lembidium ventrosum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 69, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 43.

KERGUELEN ISLAND.

Herpocladium fissum, Mitt.

Herpocladium fissum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 69, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 44.

KERGUELEN ISLAND.

Tylimanthus viridis, Mitt.

Tylimanthus viridis, Mitt. in Journ. Linn. Soc. Lond., xv. p. 197, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 44.

KERGUELEN ISLAND.

Marsupidium excisum, Mitt.

Marsupidium excisum, Mitt. in Journ. Linn. Soc. Lond., xv. p. 69, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 44.

KERGUELEN ISLAND.

Fossombronia australis, Mitt.

Fossombronia australis, Mitt. in Journ. Linn. Soc. Lond., xv. p. 73, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.

KERGUELEN ISLAND.

Fossombronia pusilla, Nees.

Fossombronia pusilla, Nees in G. L. et N. Synop. Hepat., p. 467; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.

KERGUELEN ISLAND.

Noteroclada porphyrorhiza, Nees.

Noteroclada porphyrorhiza, Nees; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.
Noteroclada confluens, Hook. f. et Tayl., Fl. Antarct., p. 446, t. 161, f. 7.

KERGUELEN ISLAND.

Symphogyna podophylla, Gottsche.

Symphogyna podophylla, Gottsche in G. L. et N., Synop. Hepat., p. 481; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.

KERGUELEN ISLAND.

Aneura multifida, Linn.

Aneura multifida, Linn. (*Jungermannia*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.

KERGUELEN ISLAND.

Aneura pinguis, Linn.

Aneura pinguis, Linn. (*Jungermannia*); Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.

KERGUELEN ISLAND.

Marchantia polymorpha, Linn.

Marchantia polymorpha, Linn.; Mitt. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.

KERGUELEN ISLAND.

LICHENES.

Lichina antarctica, Cromb.

Lichina antarctica, Cromb. in Journ. Bot., 1876, p. 21, in Journ. Linn. Soc. Lond., xv. p. 181, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 47.

KERGUELEN ISLAND.

Amphidium molybdophlacum, Nyl.

Amphidium molybdophlacum, Nyl. in Journ. Bot., 1875, p. 333 (errone *molybdophœum*); Cromb. in Journ. Linn. Soc. Lond., xv. p. 181, in Journ. Bot., 1877, pp. 103, 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 47.
Lecanora melanaspis, Bab. in Fl. Antarct., p. 536 (excl. syn. *Lecanora dichroa*).
Pannaria glaucella, Tuckerm. in Bull. U.S. Nat. Mus., iii. p. 28.

KERGUELEN ISLAND.

Stereocaulon cymosum, Cromb.

Stereocaulon cymosum, Cromb. in Journ. Linn. Soc. Lond., xv. p. 182, in Journ. Bot., 1877, p. 103, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 47.
Stereocaulon corallinum, Hook. f. et Tayl., Fl. Antarct., p. 528.

KERGUELEN ISLAND.

Cladonia fimbriata, Hoffm.

Cladonia fimbriata, Hoffm.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 182, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 47, cum var. *costata*.

Cladonia pyxidata, Linn.; Tuckerm. in Bull. Torr. Bot. Club, October 1875, et in Bull. U.S. Nat. Mus., iii. p. 29.

KERGUELEN ISLAND.

Cladonia cornuta, Linn.

Cladonia cornuta, Linn.; Cromb. in Journ. Linn. Soc. Lond., xvi. p. 220, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 47.

KERGUELEN ISLAND.

Cladonia acuminata, Acharius.

Cladonia acuminata, Acharius; Cromb. in Journ. Linn. Soc. Lond., xv. p. 182, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 47.

KERGUELEN ISLAND.

Neuropogon melaxanthus, Cromb.

Neuropogon melaxanthus, Cromb. in Journ. Linn. Soc. Lond., xv. p. 182, in Journ. Bot., 1877, pp. 103, 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 47 (varietates *sorediifer* et *ciliata*).

Usnea sulphurea, Müll.; Tuckerm. in Bull. Torr. Bot. Club, 1875, et in Bull. U.S. Nat. Mus., iii. p. 27.

Ramalina scopulorum, Hook. f. et Tayl., Fl. Antarct., p. 522.

KERGUELEN ISLAND.

Neuropogon taylori, Cromb.

Neuropogon taylori, Cromb. in Journ. Linn. Soc. Lond., xv. p. 183, in Journ. Bot., 1877, p. 103, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48.

Usnea taylori, Hook. f., Fl. Antarct., p. 521, t. 195, f. 1.

KERGUELEN ISLAND.

Parmelia stygioides, Nyl.

Parmelia stygioides, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 183, in Journ. Bot., 1875, p. 333, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48.

KERGUELEN ISLAND.

Peltigera rufescens, var. *spuria*, DC.

Peltigera rufescens, var. *spuria*, DC.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 183, in Journ. Bot., 1877, p. 103, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48.

Peltidea venosa, Hook. f. et Tayl., Fl. Antarct., p. 525.

KERGUELEN ISLAND.

Peltigera polydactyla, Acharius, forma *hymenina*, Cromb.

Peltigera polydactyla, Acharius, forma *hymenina;* Cromb. in Journ. Linn. Soc. Lond., xv. p. 183, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48.
Peltigera polydactyla, Hook. f. et Tayl., Fl. Antarct., p. 524.
Peltigera horizontalis, Acharius; Hook. f. et Tayl., Fl. Antarct., p. 525.

KERGUELEN ISLAND.

Pannaria dichroa, Cromb.

Pannaria dichroa, Cromb. in Journ. Linn. Soc. Lond., xvi. p. 220, in Journ. Bot., 1877, p. 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48.
Lecanora dichroa, Hook. f. et Tayl. in Lond. Journ. Bot., 1844, p. 643.
Parmelia taylori, Tuckerm. in Bull. Torr. Bot. Club, October 1875, et in Bull. U.S. Nat. Mus., iii. p. 28.
Parmelia placodiopsis, Nyl. in Journ. Bot. 1875, p. 334; Cromb. in Journ. Linn. Soc. Lond., xv. p. 183.
Lecanora melanaspis, Acharius; Hook. f. et Tayl., Fl. Antarct., p. 536.

KERGUELEN ISLAND.

Pannaria obscurior, Nyl.

Pannaria obscurior, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 183, in Journ. Bot. 1875, p. 334, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48.

KERGUELEN ISLAND.

Psoroma hirsutulum, Nyl.

Psoroma hirsutulum, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 184, in Journ. Bot. 1875, p. 333, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48.

KERGUELEN ISLAND.

Lecanora (Placopsis) gelida, Linn.

Lecanora (Placopsis) gelida, Linn.; Hook. f. et Tayl., Fl. Antarct., p. 535; Cromb. in Journ. Linn. Soc. Lond., xv. p. 184, in Journ. Bot. 1877, pp. 104, 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 48; (varietates *vitellina* et *lateritia*).

KERGUELEN ISLAND.

Lecanora (Placopsis) macrophthalma, Cromb.

Lecanora (Placopsis) macrophthalma, Cromb. in Journ. Linn. Soc. Lond., xv. p. 185, in Journ. Bot. 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.
Urceolaria macrophthalma, Hook. f. et Tayl. in Lond. Journ. Bot. 1844, p. 640.

KERGUELEN ISLAND.

Lecanora (Placodium) elegans, Acharius.

Lecanora (Placodium) elegans, Acharius; Cromb. in Journ. Linn. Soc. Lond., xv. p. 184, in Journ. Bot. 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.
Lecanora murorum, var. *β*, Hook. f., Fl. Antarct., p. 535.

KERGUELEN ISLAND.

Lecanora subunicolor, Nyl.

Lecanora subunicolor, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 184, in Journ. Bot. 1876, p. 19, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.

KERGUELEN ISLAND.

Lecanora vitellinella, Nyl.

Lecanora vitellinella, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 184, in Journ. Bot. 1875, p. 334, 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.
Lecanora candelaria, Acharius; Hook. f., Fl. Antarct., p. 537.

KERGUELEN ISLAND.

Lecanora cyphelliformis, Cromb.

Lecanora cyphelliformis, Cromb. in Journ Linn. Soc. Lond., xvi. p. 220, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.

KERGUELEN ISLAND.

Lecanora diphyella, Nyl.

Lecanora diphyella, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 184, in Journ. Bot. 1876, p. 21, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.

KERGUELEN ISLAND.

Lecanora atrocæsia, Nyl.

Lecanora atrocæsia, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 185, in Journ. Bot. 1875, p. 334, 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.
Lecanora confluens, Hook. f. et Tayl. in Lond. Journ. Bot. 1844, p. 636.
Lecanora albocærulescens, Acharius (?); Bab. in Fl. Antarct., p. 538.

KERGUELEN ISLAND.

Lecanora brocella, Nyl.

Lecanora brocella, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 185, in Journ. Bot. 1876, p. 21, 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.

KERGUELEN ISLAND.

Lecanora umbrina, Acharius.

Lecanora umbrina, Acharius; Cromb. in Journ. Linn. Soc. Lond., xv. p. 185, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.

KERGUELEN ISLAND.

Lecanora kerguelensis, Nyl.

Lecanora kerguelensis, Nyl.; Cromb. in Journ. Bot. 1877, p. 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.
Urceolaria kerguelensis, Tuckerm. in Bull. U.S. Nat. Mus., iii. p. 29.

KERGUELEN ISLAND.

Lecanora sublutescens, Nyl.

Lecanora sublutescens, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 186, in Journ. Bot. 1876, p. 21, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 49.

KERGUELEN ISLAND.

[*Lecanora citrina*, Acharius, *Lecanora erythrocarpa*, Fr., and *Lecanora hageni*, Acharius, enumerated in the Flora Antarctica, p. 536, from very imperfect materials, are too doubtful to be enumerated.]

Pertusaria perrimosa, Nyl.

Pertusaria perrimosa, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 186, in Journ. Bot. 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.
Pertusaria communis, DC.; Hook. f. Fl. Antarct., p. 540.

KERGUELEN ISLAND.

Pertusaria subferruginosa, Cromb.

Pertusaria subferruginosa, Cromb. in Journ. Linn. Soc. Lond., xv. p. 186, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.

KERGUELEN ISLAND.

Pertusaria cinerea, Nyl.

Pertusaria cinerea, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 186, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.

KERGUELEN ISLAND.

Lecidea variatula, Nyl.

Lecidea variatula, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 186, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.

KERGUELEN ISLAND.

Lecidea inundata, Fries.

Lecidea inundata, Fries.; Cromb. in Journ Bot., 1877, p. 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.
Biatora rubella, Ehrh.; Tuckerm. in Bull. U.S. Nat. Mus., iii. p. 29.

KERGUELEN ISLAND.

Lecidea assimilata, Nyl.

Lecidea assimilata, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 187, in Journ. Bot., 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.
Lecidea aromatica, Acharius, in parte Hook. f. Fl. Antarct., p. 538.

KERGUELEN ISLAND.

Lecidea aromatica, Acharius.

Lecidea aromatica, Acharius; Nyl. in Journ. Bot., 1877, p. 104; Cromb. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.

KERGUELEN ISLAND.

Lecidea enteroleuca, Fries?

Lecidea enteroleuca, Fries? Cromb. in Journ. Bot., 1877, p. 106; Tuckerm. in Bull. Torr. Bot. Club, Oct. 1875, et in Bull. U.S. Nat. Mus., iii. p. 30; Cromb. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.

KERGUELEN ISLAND.

Lecidea assentiens, Nyl.

Lecidea assentiens, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 187, in Journ. Bot. 1875, p. 334, et 1877, p. 105, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.
Lecidea contigua, var. *hydrophila*, Bab. in Hook. f., Fl. Antarct., p. 538.

KERGUELEN ISLAND.

Lecidea intersita, Nyl.

Lecidea intersita, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 187, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.

KERGUELEN ISLAND.

Lecidea phæostoma, Nyl.

Lecidea phæostoma, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 187, in Journ. Bot., 1875, p. 334, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.

KERGUELEN ISLAND.

Lecidea amylacea, Acharius.

Lecidea amylacea, Acharius; Cromb. in Journ. Linn. Soc. Lond., xv. p. 188, in Journ. Bot., 1877, p. 104, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 50.
Lecidea spilota, Acharius; Bab. in Hook. f., Fl. Antarct., p. 538.
Lecidea rivulosa, Tayl. in Hook. Lond. Journ. Bot., 1844, p. 636.

KERGUELEN ISLAND.

Lecidea subassentiens, Nyl.

Lecidea subassentiens, Nyl. ; Cromb. in Journ. Linn. Soc. Lond., xv. p. 188, in Journ. Bot., 1876, p. 21, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea perusta, Nyl.

Lecidea perusta, Nyl. ; Cromb. in Journ. Linn. Soc. Lond., xv. p. 188, et in Journ. Bot., 1875, p. 334, et 1877, p. 106 ; et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

Lecidea fuscoatra, Acharius ; Hook. f., Fl. Antarct., p. 539.

KERGUELEN ISLAND.

Lecidea asbolodes, Nyl.

Lecidea asbolodes, Nyl. ; Cromb. in Journ. Linn. Soc. Lond., xv. p. 188, in Journ. Bot., 1876, p. 21, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea lygomma, Nyl.

Lecidea lygomma, Nyl. ; Cromb. in Journ. Linn. Soc. Lond., xv. p. 189, in Journ. Bot., 1875, p. 334, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea subcontinua, Nyl.

Lecidea subcontinua, Nyl. ; Cromb. in Journ. Linn. Soc. Lond., xv. p. 189, in Journ. Bot., 1877, pp. 104, 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51 (cum var. *ferrea*).

Urceolaria endochlora, in parte, Hook. f., Fl. Antarct., p. 537.

KERGUELEN ISLAND.

Lecidea eatoni, Cromb.

Lecidea eatoni, Cromb. in Journ. Linn. Soc. Lond., xv. p. 189, in Journ. Bot., 1875, p. 334, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea homalotera, Nyl.

Lecidea homalotera, Nyl. ; Cromb. in Journ. Bot., 1877, p. 105, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

Urceolaria endochlora, Hook. f. et Tayl. in parte, Fl. Antarct., p. 537.

KERGUELEN ISLAND.

Lecidea disjungenda, Cromb.

Lecidea disjungenda, Cromb. in Journ. Bot., 1877, p. 105, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

Urceolaria endochlora, Hook. f. et Tayl. in parte, Fl. Antarct., p. 537.

KERGUELEN ISLAND.

Lecidea subplana, Nyl.

Lecidea subplana, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 189, in Journ. Bot. 1875, p. 334, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea stephanodes, Stirton.

Lecidea stephanodes, Stirton; Cromb. in Journ. Linn. Soc. Lond., xvi. p. 221; et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea dicksonii, Acharius.

Lecidea dicksonii, Acharius; Cromb. in Journ. Linn. Soc. Lond., xv. p. 190, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.
Lecidea sincerula, Nyl.; Cromb. in Journ. Bot., 1876, p. 22.

KERGUELEN ISLAND.

Lecidea tristiuscula, Nyl.

Lecidea tristiuscula, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 190, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea superjecta, Nyl.

Lecidea superjecta, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xvi. p. 221, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51.

KERGUELEN ISLAND.

Lecidea myriocarpa, DC.

Lecidea myriocarpa, DC.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 190, in Journ. Bot., 1877, p. 106, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 51, cum var. *erumpente*.

KERGUELEN ISLAND.

Lecidea subplicata, Nyl.

Lecidea subplicata, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 190, in Journ. Bot., 1875, p. 334, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Lecidea cerebrinella, Nyl.

Lecidea cerebrinella, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 191, in Journ. Bot., 1876, p. 22, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Lecidea stellulata, Tayl.

Lecidea stellulata, Tayl. in Fl. Hibern., p. 118; Cromb. in Journ. Bot., 1877, p. 105; Fl. Antarct., p. 539; Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Lecidea geographica, Linn.

Lecidea geographica, Linn.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 191, in Journ. Bot., 1877, p. 105, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

Lecidea geographica, var. *urceolata*, Schærer; Bab. in Hook. f., Fl. Antarct., p. 539.

KERGUELEN ISLAND.

Verrucaria tessellatula, Nyl.

Verrucaria tessellatula, Nyl; Cromb. in Journ. Linn. Soc. Lond., xv. p. 191, in Journ. Bot. 1875, p. 335, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Verrucaria obfuscata, Nyl.

Verrucaria obfuscata, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 191, in Journ. Bot., 1876, p. 22, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Verrucaria æthiobola, Acharius.

Verrucaria æthiobola, Acharius; Cromb. in Journ. Linn. Soc. Lond., xv. p. 193, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Verrucaria chlorotica, Acharius.

Verrucaria chlorotica, Acharius; Cromb. in Journ. Bot., 1877, p. 106; et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

Sagedia chlorotica, Tuckerm. in Bull. Torr. Bot. Club, et in Bull U.S. Nat. Mus., iii. p. 30.

KERGUELEN ISLAND.

Verrucaria prævalescens, Nyl.

Verrucaria prævalescens, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 192, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Verrucaria kerguelina, Nyl.

Verrucaria kerguelina, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 192, in Journ. Bot., 1876, p. 22, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Verrucaria insueta, Nyl.

Verrucaria insueta, Nyl.; Cromb. in Journ. Linn. Soc. Lond., xv. p. 192, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

Verrucaria congestula, Stirton.

Verrucaria congestula, Stirton.; Cromb. in Journ. Linn. Soc. Lond., xvi. p. 221, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 52.

KERGUELEN ISLAND.

[*Isidium oculatum*, *Isidium lutescens*, and *Lepraria flava*, all enumerated in the Flora Antarctica as doubtful, are imperfect states of Lichens.]

FUNGI.

Very few fungi have been found in Kerguelen. The following are all that are enumerated in the botany of Kerguelen Island :[1]—

Agaricus (*Galera*) *kerguelensis*, *Agaricus* (*Galera*) *hypnorum*, *Agaricus* (*Naucoria*) *furfuraceus*, *Agaricus* (*Naucoria*) *gleborum*, *Agaricus* (*Psalliota*) *campestris*, *Coprinus atramentarius*, *Coprinus tomentosus*, *Peziza* (*Sarcoscyphæ*) *kerguelensis*, *Sphæria herbarum*.

ALGÆ.

The Kerguelen Algæ, both marine and freshwater, are rather numerous. It will, perhaps, be sufficient for the purposes of this work to give a list of the species.

ALGÆ MARINÆ.[2]

Durvillea utilis, *Durvillea harveyi*, *Desmarestia rossii*, *Desmarestia chordalis*, *Desmarestia aculeata*, *Desmarestia viridis*, *Macrocystis pyrifera*, *Lessonia fuscescens*, *Asperococcus sinuosus*, *Dictyosiphon fasciculatus*, *Adenocystis lessonii*, *Scytosiphon lomentarium*, *Elachista flaccida*, *Ectocarpus geminatus*, *Sphacellaria corymbosa*, *Sphacellaria affinis*, *Rhodomela hookeriana*, *Polysiphonia abscissa*, *Polysiphonia anisogona*, *Dasya berkeleyi*, *Bostrychia vaga*, *Delisea pulchra*, *Ptilonia magellanica*, *Melobesia antarctica*, *Melobesia lichenoides*, *Melobesia kerguelena*, *Delesseria lyallii*, *Delesseria davisii*, *Delesseria quercifolia*, *Delesseria crassinervia*, *Nitophyllum fuscorubrum* *Nitophyllum multinerve?* *Nitophyllum lividum*, *Nitophyllum laciniatum*, *Chætangium variolosum*, *Plocamium hookeri*, *Rhodophyllis capensis*, *Rhodymenia palmata*, *Rhodymenia corallina*, *Phyllophora cuneifolia*, *Ahnfeltia plicata*, *Callophyllis*

[1] By the Rev. J. M. Berkeley in *Phil. Trans. Roy. Soc. Lond.*, clxviii. p. 93.

[2] By the late Professor Dickie in *Phil. Trans. Roy. Soc. Lond.*, clxviii. pp. 53–64.

variegata, Callophyllis dichotoma, Callophyllis tenera, Kallymenia dentata, Gigartina radula, Iridæa capensis, Iridæa laminarioides, Epymenia variolosa, Halymenia latissima, Ceramium rubrum, Ceramium diaphanum, Ptilota eatoni, Ballia callitricha, Callithamnion simile, Callithamnion ptilota, Callithamnion rothii, Codium adhærens, Codium tomentosum, Bryopsis plumosa, Vaucheria dillwynii, Ulva latissima, Ulva (?) cristata, Porphyra laciniata, Porphyra vulgaris, Enteromorpha compressa, Enteromorpha intestinalis, Prasiola fluviatilis, Cladophora rupestris, Cladophora arcta, Cladophora simpliciuscula, Cladophora flexuosa, Rhizoclonium riparium, Rhizoclonium ambiguum, Chætomorpha linum.

ALGÆ AQUÆ DULCIS.[1]

Stauroneis goeppertiana, Stauroneis anceps, Stauroneis phœnicenteron, Aclinanthes exilis, Larirella diaphana, Campylodiscus n. sp., *Gomphonema brebissonii, Amphiprora* n. sp., *Navicula elliptica, Navicula dicephala, Navicula minutissima, Navicula* sp., *Amphora gracilis, Pinnularia viridula, Pinnularia viridis, Pinnularia* spp., *Synedra vaucheriæ, Eunotia pectinalis, Denticula thermalis, Cymbella gastroides, Chroococcus macrococcus, Microcystis olivacea, Microcystis parasitica, Gloæthece involuta, Gloæcapsa magna, Anacystis marginata, Leptothrix hyalina, Lyngbya major, Limnactis minutula, Dasyactis kunzeana, Mastigothrix articulata, Mastigothrix æruginea, Mastigothrix minuta, Hydrocoleum eatoni, Nostoc hydrocoleoides, Nostoc polysaccum, Nostoc polysporum, Nostoc* sp., *Nostoc paludosum, Nostoc leptonema, Anabaina confervoides, Anabaina involuta, Hormosiphon leptosiphon, Hormosiphon coriaceus, Schizosiphon kerguelensis, Tolypothrix flaccida, Tolypothrix nægelii, Schizothrix hyalina, Sirosiphon vermicularis, Sirosiphon pulvinatus, Sirosiphon* n. sp., *Sirosiphon kerguelensis, Sirosiphon oliveri, Sirosiphon secundatus, Glæocystis vesiculosa, Palmella mucosa, Pleurococcus vestitus, Pleurococcus angulosus, Scenedesmus acutus, Botryococcus braunii, Oocystis nægelii, Dictyosphærium ehrenbergii, Pediastrum ellipticum, Asterosphærium elegans, Glæocystis botryoides, Glæococcus* sp., *Polyedrium tetratricum, Polyedrium minimi, Chlamydococcus* sp., *Cosmarium pseudo-nitidulum, Cosmarium crenatum, Staurastrum kerguelense, Euastrum binale, Palmoglæa* sp., *Vaucheria sessilis, Vaucheria sericea, Vaucheria pachyderma, Vaucheria geminata, Olpidium caudatum, Chytridium pyriforme, Microthamnion cladophoroides, Stigeoclonium hookeri, Stigeoclonium subtile, Choreoclonium procumbens, Draparnaldia subtilis, Draparnaldia distans, Proterderma viride, Zygogonium torulosi, Zygogonium tenuissimum, Spirogyra longata, Spirogyra* sp., *Sirogonium sticticum, Zygnema vaucheri, Zygnema affine, Bulbochæte* spp., *Oedogonium delicatulum, Oedogonium* sp., *Coleochæte scutata, Coleochæte irregularis, Aphanochæte repens, Gongrosira pachyderma, Rhizocladia repens, Batrachospermum minutissimum.*

[1] By Dr. P. F. Reinsch in *Phil. Trans. Roy. Soc. Lond.*, clxviii. pp. 65–92, 1879.

CHARACEÆ.

Nitella antarctica, Braun.

Nitella antarctica, Braun; Phil. Trans. Roy. Soc. Lond., clxviii. p. 23.
Nitella hookeri, Reinsch in Journ. Linn. Soc. Lond., xv. p. 219.
Chara flexilis, Linn., Sp. Pl., ed. 2, p. 1624; Hook. f., Fl. Antarct., p. 395.

Kerguelen Island.—In the lake at Christmas Harbour; and in that next but one to the Observatory, in Observatory Bay.

MACDONALD GROUP.

HEARD ISLAND.[1]

INTRODUCTORY NOTES.

THIS being the last of a series of islands, comprising the Prince Edward Group, the Crozets, and Kerguelen Island, dealt with in this work and enjoying a similar climate and supporting the same kind of vegetation, it is convenient to examine their flora here jointly. But first of all a few words may be said respecting the climate of the islands named, for, although the most southerly of them is not in a higher latitude than the centre of England, the nature, rather than the rigour, of the climate is such as to be very unfavourable to vegetation, not only to flowering plants and ferns but also to the lower cryptogams. This is especially the case in Heard Island, which is still in its glacial epoch. In the extracts which follow from Mr Moseley's notes will be found practically all that is known on the climate of Heard, together with comparisons of the climates of the other islands under consideration. Kerguelen, which lies only some 300 miles north of Heard, has a much milder climate, yet by no means a pleasant one. The Rev. A. E. Eaton, who spent several months there in connection with the Transit of Venus Expedition in 1874–75, describes it in the following terms[2]:—

"The climate of Kerguelen is tempestuous, chilly, and wet . . . gales, or at least strong breezes, being almost constant. The wind is usually westerly and cold. . . . The range of temperature throughout the year does not appear excessive, the highest readings of the thermometer in summer being under 70° Fahr., and the lowest in winter seldom less than 32°. At Christmas Harbour it did not descend below 27° during the stay of the 'Erebus.' Before the English expedition arrived at the island, the Americans, early in September, found the temperature one night to be as low as 18°. In the warmer months the readings are not often much higher than 55° or 56°, or much lower than 42°, on the eastern side of the island. The western coast is, however, much more bleak."

Considering the shortness of the stay of the expedition at Heard Island, Mr Moseley has furnished us with a graphic account of its physical conditions, its flora, and its fauna. True, both animal and vegetable life is little varied, but we learn from his description of the island the reason why it is so. All that bears directly or indirectly on the vegetation is contained in the following somewhat copious but intensely interesting extracts from Mr Moseley's work[3]:—

[1] Called Yong Island by Mr Moseley in *Journ. Linn. Soc. Lond.*, xiv. p. 388.

[2] *Phil. Trans. Roy. Soc. Lond.*, cxlviii. p. 3.

[3] Notes by a Naturalist on the Challenger, p. 216.

"On February 6, after beating about for several days in fog, and lying becalmed during one day, we sighted the northernmost island of the Macdonald Group, which was alternately brightened up by sunshine and hidden in the drifting scud and mist. It consists of a small main rocky mass, and two outliers with a very irregular outline and weather-beaten appearance.

"The main mass is Macdonald Island, and gives the name to the group. It is bounded on all sides by cliffs, which are high towards the eastward, but lower towards the westward. There was no snow on the island, and on one stretch of sloping flat land, a covering of vegetation could be made out similar to that of Heard Island. One of the outliers is in the form of a pinnacle, projecting straight up from the sea.

"We anchored at Heard Island, in Corinthian or Whisky Bay, as it is named by the sealers, in the afternoon, and I landed at once with Captain Nares and Mr Buchanan. Heard Island is in about lat. 53° 10′ S., long. 73° 30′ E., therefore in about the same latitude as the eastern entrance of the Straits of Magellan, and in a corresponding latitude, in the southern hemisphere, to our city of Lincoln in the northern, and it is in nearly the same longitude as Bombay. It is about twenty-five miles in extreme length, and six in extreme breadth, and has an area of about eighty square miles, with an elongate form, stretching in a direction about N.W. by W., and S.E. by E. The southernmost extremity turns eastward, and runs out into a long narrow promontory.

"Whisky Bay is near the northernmost extremity of the island. To the south-east of the ship, as she lay in the small bay, were seen a succession of glaciers descending right down to the beach, and separated by lateral moraines from one another; six of these glaciers were visible from the anchorage, forming by their terminations the coast-line eastwards. They rose with a gentle slope, with the usual rounded undulating surface upwards towards the interior of the island, but their origin was hid in the mist and cloud; and Big Ben, the great mountain of the island, said to be 7000 feet in height, was not seen by us at all.

"One of the glaciers, that nearest to the ship, instead of abutting on the sea-shore directly with its end, as did the others, presented towards its lower extremity its side to the action of the waves, and ending somewhat inland, formed a well-marked but scanty terminal moraine.

"To the sea-shore this glacier presented a vertical wall of ice, resting directly upon the black volcanic sand composing the beach. This wall exhibited a very instructive longitudinal section of the glacier mass, in which the series of curved bands produced by differential motion were most plainly marked, and visible from the distance of the anchorage.

"The ice composing the wall or cliff was evidently being constantly bulged outwards by internal pressure, and masses were thus being split off to fall on the beach, and be melted, or floated off by the tide. The ice splits off along the lines of the longitudinal crevasses, and falls in slabs of the whole height of the cliff; a freshly fallen slab, a longitudinal slice of the glacier, was lying on the beach. Some stones which were dredged in 150 fathoms between Kerguelen Island and Heard Island, Mr Buchanan[1] believed to have been recently dropped by floating ice from Heard Island. The stones in question were as yet not penetrated by the water. The other glaciers in sight cut the shore line at right angles, and thus had no terminal moraines, the stones brought down by them being washed away by the sea. These glaciers showed all the familiar phenomena of those of Europe with exact similarity. There are here the same systems of crevasses, more marked in some regions than others, and dying out towards the termination of the glacier, where the surface is smooth and generally rounded. The crevasses were of the usual deep-blue colour, and the ridges separating

[1] *Proc. Roy. Soc. Lond.*, vol. xxiv., 1876, p. 609.

them of the usual fantastic shapes. Above, the glaciers were covered with snow, which, as one looked higher and higher, was seen to gradually obliterate the crevasses, and assume the appearance of a névé. The extent of glacier free from snow was very small; the region in which thawing can take place to any considerable extent being confined to a range not far above sea-level. Here and there were to be seen, on the surface of the glacier, the characteristic deep, vertical, pipe-like holes full of water, which were lined by concentric layers of ice, composed of prisms disposed radially to the centres of the holes and produced by successive night-frosts. Cones of ice covered with sand, and appearing as if composed of sand alone, but astonishing one by their hard and resistant nature when struck with a stick, were also to be seen on the glacier. I have seen closely similar cones in the Tyrol; and, when a tyro at alpine climbing, have jarred my hand in attempting to thrust my alpenstock into them. Here the sand was black and volcanic. Small table-stones were not uncommon upon the glacier, and, in fact, all the phenomena caused by thawing from the action of direct radiant heat were present. The usual narrow longitudinal lines or cracks caused by the shearing of the ice in its differential motion were present, and gave evidence of the grinding together of the closely opposed surfaces forming them. The dirt and stones on the surface of the ice were, as is commonly the case, more abundant towards the termination of the glacier and the moraine, but they were not so abundant as usual, and there were no large stones amongst them, nor were such to be seen in the moraine.

"The harpooneer of the 'Emma Jane,' the whaling schooner with which we fell in at Kerguelen Island, told me that he had always wondered where the stones on the ice came from at all; and no wonder, for Big Ben is generally hidden from view, and the glaciers seem to have nothing above from which the stones might come. Most of the stones, no doubt, reach the surface and see the light only when they are approaching the bottom of the glacier. The terminal moraine showed the ordinary irregular, conical heaping, and marks of recent motion of the stones and earth composing it from the thawing of the ice supporting them, and a small stream running from the glacier-bed cut its way to the sea through a short arched tunnel in the ice, as so commonly occurs elsewhere. A small cascade poured out of the ice-cliff on to the sea-shore from an aperture about half-way up it. All the moraines showed evidence of the present shrinking of the glaciers.

"The view along the shore of the successive terminations of the glaciers was very fine. I had never before seen a coast-line composed of cliffs and headlands of ice. None of the glaciers came actually down into the sea, but the bases of their cliffs rested on the sandy beach, and were only just washed by the waves at high water, or during gales of wind. The lateral moraines were of the usual form, with sharp-ridged crests and natural slopes on either side, forming lines of separation between the contiguous glaciers. They were somewhat serpentine in course, and two of them were seen to occur immediately above points where the glaciers on either hand were separated by masses of rock *in situ*, which masses showed out between the ice-cliffs on the shore and had the ends of the moraines resting on them. A stretch of perfectly level black sand about half a mile in width forms the head of the bay, and intervenes between the glaciers and a promontory of rocky rising land stretching out northwards and westwards, and forming the other side of the bay, and on the smooth sandy beach bounding this plain we landed. The surf was not heavy, but we had to drag the boat up at once. In this we were helped by six wild-looking sealers, who had made their appearance on the rocks as soon as the ship entered the bay, with their rifles in their hands, and had gazed on us with astonishment. The boss said, as we landed, he 'guessed we were out of our reckoning.' They evidently thought no one could have come to Heard Island on purpose who was not in the sealing business. The sandy plain

stretches back from the bay as a dreary waste to another small curved beach at the head of another inlet of the sea. Behind this inlet is an irregular rocky mountain mass forming the end of the island, on which are two large glaciers very steeply inclined, and one of them terminating in a sheer ice-fall. At its back this mountain mass is bounded by precipices with their bases washed by the sea. The plain is traversed by several streams of glacier water coming from the southern glaciers, and these streams are constantly changing their course, as the beach and plain are washed about by the surf in heavy weather. At the time of our visit, the main stream stretched across the entire width of the plain and entered the sea at the extreme western verge of the beach, so we had to ford it. This stream was about twenty yards across, and knee-deep, and so intensely cold that it pained my legs worse than any glacier water I have ever waded in. The water was brown, opaque, and muddy, being charged with the grindings of the glaciers. Running into the sea, it formed a conspicuous brown tract, sharply defined from the blue-green water of the sea, and extending almost to the mouth of the bay. The sandy plain seemed entirely of glacial origin; it was in places covered with glacial mud, and was yielding, and heavy to walk upon. Mr Buchanan observed that the isolated rocks which had been rolled down upon this plain from the heights above were cut by the natural sand-blast into forms resembling trees on a coast exposed to trade-winds. The effect of every prevalent wind was shown by the facets cut by the blown sand upon the surfaces of the rocks, the largest facet in each case being that turned towards the west.

"The plain was strewed with bones of the sea-elephant and sea-leopard, those of the former being most abundant. There were remains of thousands of skeletons, and I gathered a good many tusks of old males. These bones lay in curved lines, looking like tide lines, on either side of the plain, above the beaches, marking the rookeries of old times and tracks of slaughter of the sealers. Some bones occurred far up on the plain, the elephants having in times of security made their lairs far from the water's edge. A few whales' *vertebræ* were also seen lying about. On the opposite side of the plain from that bounded by the glacier is a stretch of low bare rock, with a peculiar smooth and rounded but irregular surface, which appears from a distance as if glaciated; but on closer examination it is seen to show very distant ripple marks and lines of flow, and the rock-mass is evidently a comparatively recent lava-flow from a small broken-down crater which stands on the shore close by. The remains of the crater are now in the form of three fantastic, irregularly conical masses, composed of very numerous thin layers of scoriæ, conspicuous because of their varying and strongly contrasted colours and very irregular bedding. A section of the lava-flow is seen in the low cliffs forming the line of the harbour. The present condition of Heard Island is evidently that which obtained in Kerguelen Island formerly, when glaciers covered the land almost entirely and dipped down into the sea. It is, however, an extraordinary fact that Heard Island, only 300 miles south of Kerguelen Island, should thus still be in a glacial epoch, whilst in Kerguelen Island, a very much larger tract, the glaciers should have shrunk back into the interior, and have left so much of the land surface entirely free of ice, the ice epoch being there already a thing of the past.

"The great height of Big Ben, and consequent largeness of the area where snow constantly accumulates, and cannot be melted, no doubt accounts to a considerable extent for the peculiar conditions in Heard Island. A similar rapid descent of the snow-line within a few degrees of latitude occurs in the Chilian Andes,[1] so great is the chilling influence of the vast southern sea. As already mentioned, Heard Island is in a corresponding latitude to Lincoln. No doubt when England was in its last glacial epoch, Heard Island enjoyed a much milder climate, and it was possibly then that the

[1] Grisebach, *Die Vegetation der Erde*, Leipzig, 1872.

large trees grew, the trunks of which are now fossil in Kerguelen Island, and that the ancestors of *Lyallia* and *Pringlea* flourished.

"A stretch of land on the north-west side of the plain was covered pretty thickly with green, which was on closer view seen to be composed of patches of *Azorella*, growing on the summits of mud or sand hummocks, which were separated from one another by ditches or cavities of usually bare brown-mud. Some of these patches of *Azorella* were of considerable extent, and the plant was evidently flourishing and in full fruit. On some hummocks grew tufts of *Poa cookii* in full flower, and with the anthers fully developed; and on the sheltered banks of the hummocks *Pringlea antiscorbutica* grew in considerable quantity, but dwarfed in comparison with Kerguelen specimens, both in foliage and in the length of the fruiting stems. Most of it was in fruit, but some still in flower, as at Kerguelen Island.

"Around pools of water in the hollows grew a variety of *Callitriche verna* in quantity, and it occurred also in abundance submerged in company with a Conferva. In the same sheltered spots grew *Colobanthus kerguelensis*, in greater abundance even than at Kerguelen Island. These five flowering plants, all occurring also in Kerguelen Island, were the only ones found in the island, and it is improbable that any others grow there. Heard Island has thus a miserably poor flora, even for the higher latitudes of the southern hemisphere. The Falkland Islands, in lat. 51° to 52° S., have one hundred and nineteen phanerogamic plants, and Hermit Island, far to the south of Heard Island, in lat. 56° S., has eighty-four phanerogams, and amongst them trees which find their southern limit in this island.

"An Antarctic flora can in reality hardly be said to exist, since there are absolutely no phanerogamic plants within the Antarctic Circle, and on Possession Island, lying off the coast of Victoria Land, in about lat. 72° S., within the Circle, Sir Joseph Hooker found only eighteen cryptogams, and no trace of phanerogams. Yet in Saltdalen, in Norway, north of the Arctic Circle, there are fine timber forests and thriving farms, yielding abundant crops of hay and barley. Melville Island, in lat. 74° 75′ N., 500 miles north of the Arctic Circle, has a vegetation of sixty-seven flowering plants.

"Sir J. D. Hooker, in his latest memoir on the botany of Kerguelen Island, says: 'The three small archipelagos of Kerguelen Island (including the Heard Islands), Marion and Prince Edward Islands, and the Crozets, are individually and collectively the most barren tracts on the globe, whether in their own latitude or in a higher one, except such as lie within the Antarctic Circle itself; for no land, even within the North Polar area, presents so impoverished a vegetation.'[1]

"About the sides of the hummocks already described grew scantily four species of mosses, one of which proved to be new and peculiar to the island.

"The greater part of the land surface of Heard Island, free from ice, besides the green tract described, is entirely devoid of vegetation. Only on the talus slopes of the hills, on their sheltered sides, are seen scattered in a very few places scanty patches of green. These, composed lower down mainly of *Azorella*, stretch up the slopes, and terminate at an elevation of a few hundred feet in bright yellow patches, consisting entirely of mosses, just as at Marion Island, on the higher slopes. I searched in vain for lichens of any kind.

"There seems to be a very great difference with regard to the vertical range of plants in these southern islands, and in the Arctic regions. In Marion Island, I estimated the absolute limit of vegetation at an altitude of about 2000 feet; in Kerguelen Island, the limit seems to lie at about 1500 feet or lower; plants of any kind are there already scarce at 1000 feet above sea-level. In Heard Island vegetation appears to cease at 300 or 400 feet altitude. Yet in East Greenland, the

[1] Flora Antarctica, p. 216.

same plants are found to range from sea-level up to 3000 feet, and there is no real limit of altitude; even at 7000 feet elevation a thick cushion of moss, several inches in length, was found by the German North Polar Expedition covering the ground. This remarkable condition in the Arctic regions is mainly accounted for by Dr Pansch from the fact that, with the sun always near the horizon in high latitudes, the hill-slopes receive its rays nearly vertically, and thus receive more radiant heat even than the flat land below them. There is little cooling at night, the clouds and mist preventing radiation.

"In Kerguelen Island, of course, in its low latitude, the inclined surfaces do not profit so much by their inclination. There, as in the high north, the mosses and lichens are the highest plants in range. In the successive groups of islands, Marion, Kerguelen, and Heard, they come lower and lower down the mountain slopes, and in Possession Island, south of the Antarctic Circle, the few flowering plants remaining below them at Heard Island have disappeared, and they are left growing alone.

"In all the southern islands the density of the phanerogamic vegetation, the extent of development of the individual plants, and the number of species present, decrease directly with the height. The facts show how much more the constant absence of warmth, and a continuous moderately low temperature, is inimical to plant development, than is periodical cold of the severest kind. In East Greenland the condition of the vegetation in various localities depends more on the distance of these from the ice barrier than on their position more or less north or south. The vegetation becomes more abundant as progress is made inland, away from the ice-bound coast. Exactly the opposite seems to hold in Kerguelen Island, where the chief source of warmth, though at the same time the constant cause of the equalisation of temperature, is the sea, and where the accumulated snow inland, and its attendant mists, render the soil there barren. In East Greenland, phanerogamic water-plants are absent, because of the long freezing of the water in winter. In the southern island there is a *Limosella*, and a large number of the other phanerogams seem to take on a special aquatic habit.

"To return to Heard Island. At Corinthian Bay, large masses of sea-weeds were banked up on the sandy shore, where I collected eight species, which have been described by Professor Dickie.[1] Amongst them were two new species—two which occur at Kerguelen Island, whilst the remainder occur in Fuegia. The main mass appeared considerably different from the masses of algæ found on the Kerguelen shore. *Durvillea utilis* grew attached to the rocks under the cliffs, but the kelp (*Macrocystis pyrifera*) does not grow at all about this group of islands, according to the sealers, which is a remarkable fact, considering its great abundance at Kerguelen Island.

"The sealers said that the climate of Heard Island was far more rigorous than that of Kerguelen Island. In winter the whole of the ground is frozen, and the streams are stopped, so that snow has to be melted in order to obtain water; but in December, at Midsummer, there is plenty of sunshiny weather, and Big Ben is often to be seen. It is possible to land in whale-boats on the average of the whole year only once in three days, so surf-beaten is the shore, so stormy the weather."

[1] *Journ. Linn. Soc. Lond.*, vol. xv. p. 47.

History of Botanical Discovery in Kerguelen, &c.

Before the visit of the Challenger Expedition nothing whatever was known of the vegetation of Heard and Marion Islands; and although many of the characteristic vascular plants of the region were collected in Kerguelen as long ago as 1766 by Mr Anderson, surgeon of the "Resolution," commanded by Captain Cook, yet they lay almost unknown until Dr (now Sir Joseph) Hooker described them after his return with Sir James Ross's Antarctic Expedition, in 1843. There were among them:—*Azorella selago*, *Cotula plumosa*, *Pringlea antiscorbutica*, *Ranunculus crassipes*, *Poa cookii*, and *Deschampsia antarctica*.

"From 1776 till 1840"—we are now quoting Sir Joseph Hooker[1]—"when the Antarctic Expedition, under Captain (afterwards Admiral Sir James) Ross, anchored in Christmas Harbour, Kerguelen Island is not known to have been visited by any ship of war, or by the discovery or surveying ships of any nation, though it had become the frequent resort of English and American sealers. During the stay of the Antarctic Expedition [of which Sir Joseph Hooker was botanist], all the plants enumerated by Anderson as found by him in mid-summer were refound in mid-winter, together with many more, amounting to nearly one hundred and fifty, of which eighteen were flowering plants, the other large classes being—mosses and hepaticæ, thirty-five; lichens, twenty-five; and algæ, fifty-one. These have all been described in the botany of the voyage (Flora Antarctica, 1847).

"The next visit of naturalists to Kerguelen Island was that of the Challenger Expedition in January and February 1874, when Mr Moseley collected most diligently, both in Christmas Harbour and on the coast sixty to seventy miles south-east of it. He found twenty-three flowering plants in all, including three European species (*Cerastium triviale*, *Poa pratensis*, and *Poa annua*), and three species not in the collections of the Antarctic Expedition—namely, two *Ranunculi* and an *Uncinia*. He also procured flowering specimens of the *Pringlea* and the *Lyallia*, and made large accessions to the cryptogamic flora, especially on the southern localities visited."

Subsequently, in the same year, and nearly contemporaneously, the naturalists attached to various expeditions which were stationed there to observe the transit of Venus, collected in Kerguelen, but they added, we believe, no novelties to the vascular plants.

Composition of the Flora.

The flora of Marion, the Crozets, Kerguelen and Heard Islands belongs wholly to that characteristic of the coldest regions where vascular plants exist in the southern hemisphere, and differs considerably from that of the Tristan da Cunha group and St Paul and Amsterdam Islands, at least as far as the vascular plants are concerned. It is usually termed Antarctic in contradistinction to Arctic, but it should be borne in mind that no vascular plants have been found within the Antarctic Circle, nor indeed within some degrees of it. Neither a tree nor a shrub exists, the nearest approach to the latter being the very dwarf, densely-tufted plants such as *Colobanthus*, *Lyallia*, and *Azorella*. Altogether only thirty species of vascular plants have been discovered in these islands. Of these twenty-

[1] *Phil. Trans. Roy. Soc. Lond.*, clxviii.

one are flowering plants, two are club-mosses, and seven are ferns. The extreme poverty of the flora is probably due to local causes rather than isolation, for the physical conditions are generally unfavourable to vegetation, as is exemplified in Heard Island, especially, where the species are individually poor in numbers.

Here follows a table of the vascular plants:—

Tabular View of the Distribution of the Vascular Plants of Marion Island, the Crozets, Kerguelen, and Heard Islands.

Name.	Marion.	Crozets.	Kerguelen.	Heard.	General Distribution.
Ranunculus biternatus, et var. crassifolius	×	...	×	...	Fuegia; Falklands; Tristan da Cunha ? Amsterdam Island.
Ranunculus trullifolius	...	...	×	...	Fuegia; Falklands.
Ranunculus moseleyi	...	...	×	...	Endemic.
Pringlea antiscorbutica	×	×	×	×	Endemic.
Colobanthus kerguelensis	...	...	×	×	Endemic.
Lyallia kerguelensis	...	...	×	...	Endemic.
Montia fontana	×	...	×	...	Generally diffused.
Acæna adscendens	×	×	×	...	New Zealand; Macquarie Island; Fuegia; Falklands.
Callitriche verna	×	...	×	×	Widely diffused.
Tillæa moschata	×	...	×	...	New Zealand; Lord Auckland and Campbell Is.; Falklands; Fuegia.
Azorella selago	×	×	×	×	Fuegia; Macquarie Island.
Galium antarcticum	...	×	×	...	Fuegia; Falklands.
Cotula plumosa	...	×	×	...	Lord Auckland, Campbell, and Macquarie Islands.
Limosella aquatica	...	...	×	...	Fuegia; New Zealand, and very widely dispersed.
Juncus scheuchzerioides	...	...	×	...	Fuegia; Falklands; Lord Auckland and Campbell Islands.
Uncinia compacta	...	...	×	...	Tasmania; New Zealand.
Deschampsia antarctica	...	...	×	...	Fuegia; Falkland Islands; Shetlands.
Agrostis magellanica	...	...	×	...	Chili; Fuegia; Falklands; Campbell Islands.
Poa cookii	×	...	×	×	Endemic.
Festuca erecta	...	...	×	...	Fuegia; Falklands.
Festuca kerguelensis	...	...	×	...	Endemic.
Lycopodium saururus	×	...	×	...	Widely dispersed in South America, and occurring in West and South Africa.
Lycopodium clavatum, var. magellanicum	×	...	×	...	Widely dispersed, including New Zealand and South America.
Hymenophyllum tunbridgense *β.* wilsoni	×	...	...	...	Very widely dispersed, including New Zealand.
Cystopteris fragilis	...	...	×	...	General in temperate regions, though wanting in many of the oceanic islands.
Lomaria alpina	×	×	×	...	All round the south temperate zone.
Asplenium obtusatum	...	×	...	...	All round the south temperate zone.
Aspidium mohrioides	×	...	...	...	California: Chili; Fuegia; Falklands; Amsterdam Island.
Polypodium vulgare, var.	...	...	×	...	North temperate zone; Hawaii; South Africa.
Polypodium australe	×	...	×	...	Generally diffused in the south temperate zone.
Totals	14	7	27	5	... ...

Out of a total of thirty vascular plants, six, or one-fifth, are endemic in these islands; seven are American and not found in New Zealand or any of the neighbouring islands, though two of them also occur in Amsterdam Island; two are found in New Zealand or the neighbouring islands, but not in South America or in any of the islands adjacent thereto; while fifteen are common to the American and New Zealand regions. The solitary species yet to be accounted for is *Polypodium vulgare*, the distribution of which is peculiar, and not specially American. It has a wide range in the north temperate zone, and also exists in the Sandwich Islands and South Africa, but we are not aware that it has been recorded from any other part of the southern hemisphere, except Kerguelen Island, and the form which occurs there is only known elsewhere from the Sandwich Islands. Numerically, then, there is a preponderance of Fuegian forms represented in Kerguelen and the other islands under consideration, as opposed to what may be termed New Zealand forms. The Antarctic flora may have spread from America; but with all the facts before us there does not seem to be a special affinity between the floras of Kerguelen, &c., and Fuegia, as distinguished from the flora of the zone generally. Taking the New Zealand flora as a whole, and the Fuegian flora as a whole, the former is as strongly represented in these islands by the same and allied species as the latter, indicating a former flora of the same elements spread all round a southern zone, which included a part of New Zealand and the extreme south of America as well as the present isolated spots of dry land in the same latitudes. Assuming the correctness of this view, the former Antarctic flora resembled the present Arctic flora in being composed of the same elements throughout; though the survivors of that flora offer a larger endemic element in each region, which may be attributed to their long separation.

Excluding the two endemic genera in the above table, all the others are represented both in New Zealand and Fuegia. On the other hand, the endemic species exhibit, perhaps, a closer affinity with Fuegian than with New Zealand species. The endemic genus *Pringlea* is more nearly related to the northern *Cochlearia* than to any southern genus; while *Lyallia* is allied to the Andean *Pycnophyllum*. Of course the existence of a former continuous Antarctic flora, composed of essentially the same elements throughout its whole area, does not exclude the possibility of that flora having been derived from the Andean region; yet the contrary may have been the case so far as the Antarctic element in the latter is concerned. The eminently Antarctic genera *Colobanthus*, *Acæna*, and *Uncinia* extend northward through the Andes to Mexico, yet they are not entirely restricted to the Andes and the Antarctic regions, or even to the countries nearest to them. Thus *Uncinia*, independently of the doubtful *Uncinia microglochin* (syn. *Carex microglochin*), is represented in the Sandwich Islands, and *Acæna* in Polynesia, as well as in South Africa. In a restricted sense *Azorella* is only American and Antarctic; but since Sir Joseph Hooker published his later analysis of the flora of Kerguelen, *Azorella selago* has been collected in Macquarie Island, which we regard as being within the New Zealand region. Still the New

Zealand species of *Azorella*, formerly regarded as constituting an independent genus (*Pozoa*), differ in habit rather than structure from the typical *Azorella*. Much more might be said in elucidation of this subject, but we must leave it here. The exploration of the lofty mountains of New Guinea may be expected to throw some light on the former distribution of southern types of vegetation. As an illustration of the southern type extending northward in both hemispheres the genus *Nertera* may be mentioned. In the Tristan da Cunha group, besides an endemic species, the very widely-dispersed *Nertera depressa* occurs. This species is common in New Zealand and some of the neighbouring islands, and South Australia, as well as in America, from Fuegia through the Andes to Mexico, and also in some of the Pacific Islands. In New Zealand there are three other species of the genus, two of which are endemic, and the third "appears to be also a Philippine Island plant." There is one endemic Australian species, and two or three occur in the mountains of Java and other islands of the Indian Archipelago, one of them being closely allied to *Nertera depressa*.

In conclusion, allusion may be made to the affinities of the flora of Marion, the Crozets, Kerguelen and Heard Islands on the one hand, with that of the Tristan da Cunha group and the islands of Amsterdam and St Paul on the other hand. Only two of the flowering plants are common to the northern and southern groups of islands, namely, *Ranunculus biternatus* and *Uncinia compacta*; and the genus *Acæna* is represented by different species in these two latitudinal regions. Altogether, the vegetation of the northern group of islands is of a type characteristic of a warmer climate, comprising American, New Zealand, and African elements, associated with a proportionately large endemic one.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.

CRUCIFERÆ.

Pringlea antiscorbutica, R. Br.

Pringlea antiscorbutica, R. Br. in Hook. f., Fl. Antarct., p. 239 t. 90; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389.

HEARD ISLAND. *Moseley.*

Kerguelen, Crozets, and Marion Islands.

The Heard Island form is a very dwarf, though stout one, owing, doubtless, to a less fertile soil.

CARYOPHYLLEÆ.

Colobanthus kerguelensis, Hook. f.

Colobanthus kerguelensis, Hook. f., Fl. Antarct., p. 249 t. 92, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 19; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389.

HEARD ISLAND. *Moseley.*

Elsewhere only known from Kerguelen Island.

HALORAGEÆ.

Callitriche verna, Linn., subsp. *obtusangula*, Hook. f.

Callitriche verna, Linn., subsp. *obtusangula*, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 20.
Callitriche obtusangula, Le Gall.; Hegelm., Monogr. Callitr., p. 54.
Callitriche verna, Linn., Sp. Pl., ed. 2, p. 6; Hook. f., Fl. Antarct., p. 272.
Callitriche antarctica, Engelm.; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389.

HEARD ISLAND. *Moseley.*

Very widely dispersed in the temperate regions of both hemispheres.

UMBELLIFERÆ.

Azorella selago, Hook. f.

Azorella selago, Hook. f., Fl. Antarct., p. 284, t. 99; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389.

HEARD ISLAND. *Moseley.*

In many of the islets from Cape Horn eastward to Macquarie Island.

GRAMINEÆ.

Poa cookii, Hook. f.

Poa cookii, Hook. f. in Phil. Trans. Roy. Soc. Lond., clxviii. p. 22.
Festuca cookii, Hook. f. Fl. Antarct., p. 382, t. 139; Oliver in Journ. Linn. Soc. Lond., xiv. p. 389 (varietas).

HEARD ISLAND. *Moseley.*

The typical plant is found in Kerguelen and Marion Islands.

[*Agrostis magellanica* (*Agrostis antarctica*) is recorded from Heard Island in the Botany of Kerguelen Island, p. 21, but this is an error.]

CRYPTOGAMÆ.

MUSCI.

Ceratodon purpureus, Brid.

Ceratodon purpureus, Brid.; Hook. f. Fl. Antarct., p. 131; Mitt. in Journ. Linn. Soc. Lond., xv. p. 73.

HEARD ISLAND.—In a small, starved, and blackened state, barren—*Moseley.*

One of the most generally diffused of all mosses.

Grimmia (Schistidium) insularis, Mitt. (Plate LIII.)

Grimmia (*Schistidium*) *insularis*, Mitt. in Journ. Linn Soc. Lond., xv. p. 73.

Monoica. Pulvinato-cæspitosa. Folia patentia, siccitate subfalcatim curvata, lanceolata, subulato-angustata, superne carinata, integerrima, nervo crassiusculo percursa, cellulis superioribus rotundis obscuris, basalibus ad nervum angustis elongatis, ad angulos oblongis rectangulis hyalinis; perichætialia erecta, convoluta, ovali-elliptica, acuminata, cellulis basalibus oblongis angulatis, superioribus parvis oblongis rotundisque intermixtis. Theca immersa, subrotunda, ore amplo, operculo conico-acuminato, peristomio dentibus brevioribus.

HEARD ISLAND. *Moseley.*

Grimmiæ maritimæ statura habituque simillima sed foliis apice angustiore acuminatis et basi cellulis diversiformibus areolatis margine nullibi recurvis.

Bartramia robusta, Hook. f. et Wils.

Bartramia robusta, Hook. f. et Wils. Fl. Antarct., p. 133, t. 59, fig. 4; Mitt. in Journ. Linn. Soc. Lond., xv. p. 73.

HEARD ISLAND.—A small state of what appears to be this species is intermixed with *Ceratodon purpureus*—*Moseley.*

Also in Lord Auckland and Campbell Islands.

HEPATICÆ.

Fossombronia australis, Mitt.

Fossombronia australis, Mitt. in Journ. Linn. Soc. Lond., xv. p. 73, et in Phil. Trans. Roy. Soc. Lond., clxviii. p. 45.

HEARD ISLAND. *Moseley.*

Also in Kerguelen Island.

Barren specimens, but they appear to be the same as fertile plants from New Zealand and Tasmania. With the habit and appearance of the European *Fossombronia pusilla*, they have the size of *Fossombronia angulosa*, Raddi.

ALGÆ.

MELANOSPERMEÆ.

FUCACEÆ.

Scytothalia obscura, Dickie.

Scytothalia obscura, Dickie in Journ. Linn. Soc. Lond., xv. p. 47.

Frondibus e radice callosa, inferne simplicibus, superne decomposito-pinnatus; phyllodiis linearibus, apicibus indivisis bel bifidis, acutis; receptaculis ?

A solitary specimen, having several fronds from a scutate root, agreeing in structure and general habit with the genus *Scytothalia*. What seem to be immature receptacles are crowded on the margins and surface of the fronds.

HEARD ISLAND. *Moseley.*

SPOROCHNACEÆ.

Desmarestia rossii, Hook. f. et Harv.

Desmarestia rossii, Hook. f. et Harv. in Hook. Lond. Journ. Bot., 1845, p. 249; Hook. f., Fl. Antarct., p. 161, t. 172, 173; Dickie in Journ. Linn. Soc. Lond., xv. p. 47.

HEARD ISLAND. *Moseley.*

Kerguelen Island; Patagonia; Falklands.

LAMINARIACEÆ.

Lessonia nigrescens, Bory.

Lessonia nigrescens, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 80, t. 5; Kütz., Sp. Alg., p. 581; Hook. f., Fl. Antarct., t. 167, 168; Dickie in Journ. Linn. Soc. Lond., xv. p. 47.

HEARD ISLAND. *Moseley.*

Falklands; Patagonia.

Lessonia ovata, Hook. f. et Harv.

Lessonia ovata, Hook. f. et Harv. in Hook. f. Fl. Antarct., ii. p. 459, tt. 167, 168, et 171; Kütz., Sp. Alg., p. 582; Dickie in Journ. Linn. Soc. Lond., xv. p. 47.

HEARD ISLAND. *Moseley.*

Falkland Islands; Patagonia.

RHODOSPERMEÆ.

LAURENCIACEÆ.

Delisea pulchra, Mont.

Delisea pulchra, Mont. ex Kütz., Sp. Alg., p. 770; Dickie in Journ. Linn. Soc. Lond., xv. p. 48.
Bowiesia pulchra, Grev., Syn. Alg., p. 57.

HEARD ISLAND. *Moseley.*

Kerguelen Island; West Australia; New South Wales; New Zealand.

SPHÆROCOCCOIDEÆ.

Botryoglossum platycarpum, Kütz.

Botryoglossum platycarpum, Kütz., Phyc. Gener., p. 446, et Sp. Alg., p. 881; Dickie in Journ. Linn. Soc. Lond., xv. p. 48.
Fucus platycarpus, Turn., Fuc., t. 144.

HEARD ISLAND. *Moseley.*

Cape of Good Hope; Falklands; Chili; California.

RHODYMENIACEÆ.

Plocanium hookeri, Harv.

Plocanium hookeri, Harv. in Hook. Lond. Journ. Bot., 1845, p. 257; Kütz., Sp. Alg., p. 886; Dickie in Journ. Linn. Soc. Lond., xv. p. 48.

HEARD ISLAND. *Moseley.*

Kerguelen Island.

CRYPTONEMIACEÆ.

Callophyllis elongata, Dickie.

Callophyllis elongata, n. sp.? Dickie in Journ. Linn. Soc. Lond., xv. p. 48.

Fronde elongata, parce dichotoma, segmentis linearibus, inferne angustata, prope basin angustissima, margine undulata.

Two specimens of a red-purple colour, without fructification, but having the characteristic structure of the genus.

HEARD ISLAND. *Moseley.*

AMSTERDAM AND ST PAUL ISLANDS.

INTRODUCTORY NOTES.

Position and Physical Conditions.

Amsterdam Island lies in about 37° 50′ S. latitude and 77° 30′ E. longitude, or nearly 5000 miles distant from the Tristan da Cunha group, and St Paul Island is about fifty miles south of it. They are of volcanic origin, and the former is much the larger, though barely six miles across. It is oblong in shape, and rises to a height of 2760 feet. St Paul Island is only about a quarter the size of Amsterdam, and of irregular, quadrangular form, with a circular submerged crater on the north-east side, The highest point of this island is about 840 feet. Formerly, as we are informed by Sir Joseph Hooker, the names of these two islands were reversed in the best charts; and the plants recorded in the Flora Antarctica from Amsterdam Island were really from St Paul Island, as well as those mentioned by Reichardt[1] as having been collected by Sir George Staunton.

Botanical History.

Labillardière,[2] who followed Cook in reversing the names of the two islands, recorded the existence, in 1792, of forests in Amsterdam Island, and the fact that at the very time they were passing these forests were in flames in various parts. No landing was effected; and it was not until 1873 that it was ascertained that the forests were composed of *Phylica nitida* (*Phylica arborea*), the same species which forms the sole arboreous vegetation in the Tristan da Cunha group, and which also inhabits Bourbon and Mauritius. The late Captain Goodenough, then Commodore on the Pacific station, landed from H.M.S. "Pearl" and brought away a specimen of what he affirmed, and what has since proved to be, the only kind of tree growing on the island, as well as a fragment of a fern. This specimen was sent to Sir Joseph Hooker, who thereupon drew up a brief account[3] of the

[1] *Verhandl. d. k. k. zool.-bot. Gesellsch. Wien*, xxi.

[2] Relation du Voyage à la Recherche de la Perouse, i. p. 111.

[3] See *Journ. Linn. Soc. Lond.*, xiv. p. 474.

botany of the two islands. This was based upon a small collection of plants, in the herbarium of the British Museum, from St Paul Island made by Sir George Staunton on Macartney's voyage in 1793, previously described by Reichardt in the place cited from a duplicate set in the Vienna Herbarium; a more extensive collection made by MacGillivray and Milne in 1853, and Reichardt's published enumeration of the plants collected in the same island in 1857 by the naturalists of the "Novara" Expedition. Only three plants were then known from Amsterdam Island—namely, the *Phylica*, and the fern plucked by Commodore Goodenough in 1873, and *Spartina arundinacea*, identified by the Austrians, who landed, but were unable to penetrate into the interior of the island. In 1873, a French expedition for the observation of the transit of Venus took up its station on Amsterdam Island, and the naturalists appear to have thoroughly explored the island, though only portions of the botany have yet been published. But a set of the plants collected by them having been communicated to the Kew Herbarium, we have included them in the following enumeration. It is possible that this set was not a full one; and if this be the case, our list is incomplete. From the notes accompanying the plants collected by the French naturalists, it would appear that the *Phylica* is not so abundant as in the time of Labillardière and Staunton. In Macartney's Embassy to China, i. p. 226, we find the following passage:—"St Paul's [now called Amsterdam], or the island lying in sight, and to the northward of Amsterdam [now called St Paul's], differed in appearance materially from the latter. . . . It was overspread with shrubs and trees of middling size." The French note that it formed small woods in 1873. It is noteworthy that this tree does not occur in St Paul Island, though it is so near Amsterdam, and covered all over, as Sir G. Staunton states, with a fine mould—that is, humus. *Spartina arundinacea* covers broad tracts in Amsterdam, growing in thickets as impenetrable as the densest virgin forests. In St Paul Island it is scattered, and not very abundant. Curiously enough, in a note on the vegetation of Amsterdam Island, Mr Velain does not mention *Spartina;* yet he states that *Scirpus nodosus* grows to the height of a man, and so close together that it is very tiring to push through it.[1] We suspect a slip of the pen here.

Composition of the Vegetation.

A comparison of the table given below with that exhibiting the flora of Tristan da Cunha, reveals strong points of resemblance not shared by Kerguelen and the other islands in higher latitudes, although the latter are nearer to Tristan and Amsterdam than these are to each other.

[1] Végétation du Globe, Grisebach et Tchihatchef, i. p. 819.

Tabular View of the Distribution of the Vascular Plants of the Islands of Amsterdam and St Paul.

Name.	Amsterdam.	St. Paul.	General Distribution.
Ranunculus biternatus	×	...	Fuegia, Falklands, Tristan da Cunha, Marion, and Kerguelen Islands.
Colobanthus diffusus	...	×	Endemic.
Phylica nitida	×	...	Tristan da Cunha group; Bourbon; Mauritius.
Acæna sanguisorbæ	×	...	Tasmania, New Zealand, Lord Auckland, Campbell, and Macquarie Islands, and Tristan da Cunha.
Apium australe	×	×	South temperate zone generally.
Calystegia sepium	×	...	Widely diffused in north and south temperate regions.
Plantago stauntoni	...	×	Endemic.
Plantago pentasperma	×	...	Endemic.
Juncus communis	×	×	Cosmopolitan.
Scirpus aucklandicus	×	...	New Zealand; Lord Auckland and Campbell Islands.
Scirpus atropurpureo-vaginatus	×	...	Endemic.
Scirpus nodosus	×	×	South temperate and subtropical regions.
Uncinia brevicaulis var.	×	×	Tristan da Cunha group.
Uncinia compacta	×	×	Kerguelen; New Zealand; Tasmania; Australia.
Spartina arundinacea	×	×	Tristan da Cunha group.
Trisetum insulare	...	×	Endemic.
Agrostis delislei	×	...	Endemic.
Agrostis difficilis	×	...	Endemic.
Poa novaræ	×	×	Endemic.
Lycopodium trichiatum	×	...	Tropical America; Bourbon.
Lycopodium cernuum	...	×	Widely diffused in warm countries.
Lycopodium saururus	×	...	South America, common, and in South and West Africa.
Gleichenia polypodioides	×	...	South Africa, common.
Hymenophyllum obtusum	×	...	Polynesia; South Africa.
Hymenophyllum tunbridgense	×	...	Very widely spread.
Trichomanes saxifragoides	×	...	Japan; Ceylon; Java; Borneo; New Guinea; Polynesia.
Lomaria alpina	×	×	All round the south temperate zone.
Blechnum australe	×	×	South Africa; Tristan da Cunha; Mascarene Islands; Ascension?
Asplenium furcatum	×	...	Widely diffused in warm countries.
Nephrodium villosum	...	×	Throughout Tropical America.
Nephrodium aquilinum	×	...	Tristan da Cunha group.
Nephrodium filix-mas	×	×	Widely dispersed, though not in extra-tropical South America, Australia, or New Zealand.
Aspidium coriaceum	×	...	Widely diffused in the southern hemisphere.
Aspidium mohrioides	×	...	California; Chili; Fuegia; Falklands; Marion Island.
Polypodium australe	×	...	Generally diffused in the south temperate zone.
Polypodium serrulatum[1]	×	...	Generally diffused in the tropics, and extending into subtropical regions.
Acrostichum succisæfolium	×	...	Tristan da Cunha group.
Monogramme graminea[1]	×	...	South Africa, and Mascarene Islands.
Totals	33	15	... ...

An analysis of the foregoing table brings out some remarkable features in the flora of these two islands. Altogether, thirty eight vascular plants are known to exist, and these

[1] As explained further on, it is a little doubtful whether these two ferns were collected in Amsterdam Island.

consist of equal numbers of phanerogams and cryptogams. In Amsterdam, thirty-three species have been collected, whereof seventeen are cryptogams and sixteen phanerogams; and of fifteen from St Paul, five are cryptogams. Nine of the flowering plants are endemic, whereas not one of the ferns or club-mosses is peculiar to these islands. Out of the nine endemic species, three—*Colobanthus diffusus*, *Plantago stauntoni*, and *Trisetum insulare*, are only known from St Paul Island; four—*Plantago pentasperma*, *Scirpus atropurpureo-vaginatus*, *Agrostis delislei*, and *Agrostis difficilis*, are only recorded from Amsterdam; and two—*Uncinia brevicaulis* and *Poa novaræ*, occur in both islands. The *Scirpus* should perhaps not rank higher than a variety of *Scirpus nodosus*. Of the ten remaining flowering plants, only one, *Ranunculus biternatus*, is American, and not New Zealand, whereas three are New Zealand plants, but not American. Two are generally diffused in the south temperate zone, and one is much more widely distributed. The other two, *Phylica nitida* and *Spartina arundinacea*, which are characteristic plants, the former of Amsterdam only, and the latter of both islands, both occur and predominate in the Tristan da Cunha group; the former likewise inhabits Bourbon and Mauritius, while the latter is apparently restricted to Tristan da Cunha and these islands. Among the ferns are two similarly limited in their distribution, while several are African or Mascarene,[1] and not American. Only two are specially American, and the rest have a wide range.

The vegetation is clearly of composite origin, and the remarks on this point in the preceding account of the flora of Tristan are equally applicable here.

A few introduced plants have more or less established themselves in Amsterdam and St Paul Islands. They are:—*Stellaria media*, *Daucus carota*, *Sonchus oleraceus*, *Sonchus arvensis*, *Rumex acetosa*, *Poa annua*, *Polypogon monspeliensis*, *Panicum sanguinale*, *Holcus lanatus*, and *Holcus mollis*.

Sonchus oleraceus had become so common that MacGillivray and Milne thought it might be indigenous.

[1] We suspect the correctness of the record of two or three of these species for reasons given under the species in question in the following catalogue.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

RANUNCULACEÆ.

Ranunculus biternatus, Sm.

Ranunculus biternatus, Sm. in Rees' Cycl.; DC., Prodr., i. p. 30; Hook., Ic. Pl., t. 497; Hook. f., Fl. Antarct., p. 224.

Amsterdam Island.—Among *Sphagnum* at an altitude of about 2000 feet—*De l'Isle*, 42.

Fuegia; Falklands; Tristan da Cunha? Marion and Kerguelen Islands.

CARYOPHYLLEÆ.

Colobanthus diffusus, Hook. f.

Colobanthus diffusus, Hook. f., Fl. Antarct., p. 249, et in Journ. Linn. Soc. Lond., xiv. p. 477.
Sagina hochstetteri, Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi. Abhandl. p. 34.

St Paul Island. *Sir G. Staunton; Lieut. J. A. Smith; Hochstetter.*

There is no doubt that Hooker and Reichardt have described the same plant; but from the very imperfect specimens in Kew Herbarium, we are unable to decide whether it be a *Colobanthus* or a *Sagina*. Reichardt seems to have had better specimens, and he describes petals, which no true *Colobanthus* possesses, we believe. On the other hand, the valves of the capsule are described in the Flora Antarctica as opposite the perianth segments—a character of *Colobanthus*.

RHAMNEÆ.

Phylica nitida, Lam.

Phylica nitida, Lam., Encycl. Bot., ii. p. 77, n. 2613; DC., Prodr., ii. p. 35, excl. *β eriophora*.
Phylica arborea, Thouars, Esquisse Fl. Trist., p. 45; Hook. f. in Journ. Linn. Soc. Lond., xiv. p. 475; Vélain in Comptes rendus, lxxx. (1875), p. 1000.

Amsterdam Island.—Forming small woods—*Goodenough; De l'Isle*, 16.

Tristan da Cunha; Bourbon; Mauritius.

For further particulars concerning this tree see *ante*, p. 148.

ROSACEÆ.

Acæna sanguisorbæ, Vahl.

Acæna sanguisorbæ, Vahl, Enum., i. p. 294; Hook. f., Handb. Fl. N. Zeal., p. 56.

AMSTERDAM ISLAND.—Beginning at an altitude of about 400 feet, where only a few plants are seen; but it ascends to the summit, becoming commoner in the higher parts—*De l'Isle.*

Common in New Zealand and Tasmania; also occurring in Lord Auckland's group, and Campbell and Macquarie Islands, as well as in the Tristan da Cunha group. In Marion and Kerguelen Islands it is represented by the allied *Acæna adscendens.*

UMBELLIFERÆ.

Apium australe, Thouars.

Apium australe, Thouars, Esquisse Fl. Trist., p. 43; Benth., Fl. Austr., iii. p. 372; Hook. f., Handb. Fl. N. Zeal., p. 90.

ST PAUL.—On the low sands, and in a stunted condition on the summit of the mountain—*Milne and MacGillivray; Smith.*

AMSTERDAM ISLAND.—Only in humid places on the sea-shore—*De l'Isle*, 45.

South temperate zone.

The Amsterdam plant is much slenderer than our other insular specimens, though not so slender as some of the New Zealand and Australian forms.

Among the plants collected by Sir G. Staunton in St Paul Island is a fragment which Sir J. D. Hooker doubtingly referred to the genus *Azorella;* nothing, however, of this affinity was collected by MacGillivray and Milne, or by the naturalists of the French expedition.

CONVOLVULACEÆ.

Calystegia sepium, R. Br.

Calystegia sepium, R. Br., Prodr. Fl. Nov. Holl., p. 483; Hook. f., Handb. Fl. N. Zeal., p. 197.
Convolvulus sepium, Linn., Sp. Pl., ed. 1, p. 153.

ST PAUL ISLAND.—Abundant about fifty yards from the margin of the basin—*Milne.*

Widely diffused in the temperate zones of both hemispheres. This does not appear to have been collected by either the French or the Austrian expeditions.

PLANTAGINEÆ.

Plantago stauntoni, Reichardt. (Plates XLI., XLII.—A.)

Plantago stauntoni, Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi. Abhandl. pp. 8 et 33.

ST PAUL ISLAND.—All over the island—*MacGillivray and Milne;* growing in the elevated parts of the island—*De l'Isle;* without any observations—*Lieut. Smith.*

Although our plants do not agree in every particular with Reichardt's description of *Plantago stauntoni*, we have no doubt of their being that species. Reichardt describes the capsule as 4-seeded; but he probably overlooked the solitary apical seed, which we found in every one of the capsules opened, and also in the ovular state in our *Plantago pentasperma*.

With regard to dimorphism in the flowers of this species, Reichardt makes no allusion to it, and it is possible that what we have taken for a form having the tube of the corolla much shorter than the lobes is only a young state of the form represented in Plate XLI.

Plantago pentasperma, Hemsl. (Plate XLII.—B. and C.)

Plantago pentasperma, Hemsl., n. sp.

Herba annua? acaulis, villosa, glabrescens. *Folia* lineari-oblonga vel subspathulata, semi- ad sesquipollicaria, obtusa, deorsum attenuata, crassiuscula, enervia. *Scapi* erecti, graciles, supra medium floriferi, bracteis quam flores longioribus vel brevioribus. *Flores* dioici? dimorphi, aliis corollæ tubo quam lobi breviore et staminibus inclusis, aliis corollæ tubo quam lobi longiore et staminibus exsertis. *Capsula* pseudo-trilocularis, sæpissime 5-sperma; semina dimorpha, 2 collateralia oblonga in utroque latere septi, et 1 subhemisphericum in apice septi.

Amsterdam Island.—Not found in the lower parts of the island: commencing at an altitude of about 500 feet, and ascending nearly to the summit—*De l'Isle*.

The flowers of *Plantago pentasperma* are apparently dimorphic; whether they be functionally unisexual, or the one form unisexual and the other hermaphrodite, the material is insufficient to determine. In the one form the tube of the corolla is much longer than in the lobes, and the stamens apparently exserted, though we have not actually seen anthers; in the other, the tube is much shorter than the lobes, and the stamens apparently included. We say apparently included, because the two or three flowers we have been able to examine were young, and it is possible that in an older state the filaments would be much longer and the anthers exserted. It is more likely, however, that the corolla of this form, as in analogous forms of some northern species, never fully opens, and the stamens remain enclosed. The pistil of this form seemed to be perfect, but the one ovary examined was very small, and no ovules were detected. The specimens of the form having long-tubed corollas bear nearly ripe capsules, and the form of the septum or placenta—for it is more like an irregularly shaped placenta than a true septum—is very singular. It was not possible to determine with certainty whether the body bearing the seeds was attached anywhere except at the base. When the seeds are ripe the placenta detaches with the operculum, with which it may, or may not, have organic union. This placenta or septum is so formed that it divides the lower two-thirds of the capsule into two cells, and leaves the upper third one-celled. In each of the lower cells there are two oblong seeds covering the whole face

of the placenta or septum, and filling the cavity; while in the upper cell is a solitary seed of irregular, nearly hemispherical shape, more or less embedded in the top of the placenta. It is quite separated from the others, and, unlike them, it cannot fall out before the operculum itself becomes detached from the placenta.

PHANEROGAMÆ.—MONOCOTYLEDONES.

JUNCACEÆ.

Juncus communis, E. Mey.

Juncus communis, E. Mey., Syn. Junc., p. 12; Benth., Fl. Austr., vii. p. 128; Hook. f., Handb. Fl. N. Zeal., p. 290.
Juncus effusus et *conglomeratus*; Linn., Sp. Pl., ed. i. p. 326.

Amsterdam Island. *De l'Isle.* St Paul Island.—Abundant all over the island—*Milne.*

Almost everywhere in temperate regions, though wanting in most oceanic islands.

CYPERACEÆ.

Scirpus aucklandicus, Bœckl.

Scirpus aucklandicus, Bœckl. in Linnæa, xxxvi. p. 491.
Isolepis aucklandica, Hook. f., Fl. Antarct., i. p. 88, t. 50, et Handb. Fl. N. Zeal., p. 302.

Amsterdam Island.—Beginning at an elevation of about 750 feet—*De l'Isle*, 31.

New Zealand; Lord Auckland and Campbell Islands.

Scirpus atropurpureo-vaginatus, Bœckl.

Scirpus atropurpureo-vaginatus, Bœckl. in Flora, 1882, p. 14.

Amsterdam Island. *Vélain.*

We have not seen this, but from the description we think it is a variety of *Scirpus nodosus.*

Scirpus nodosus, Rottb.

Scirpus nodosus, Rottb., Descr. et Ic. Pl., p. 52, t. 8, fig. 3; Benth., Fl. Austr., vii. p. 331.

St. Paul Island. *Milne* and *MacGillivray; De l'Lisle*, 9. Amsterdam Island. *Vélain.*

Generally dispersed in the south temperate zones, and extending in some places into subtropical regions, and one of the most abundant plants in the island of Amsterdam, growing sometimes as tall as a man, according to Vélain,[1] and in such dense thickets as to

[1] Comptes rendus, lxxx., 1875, p. 1000.

be a great obstacle to travelling. Mr Vélain states that there is a belt of this plant around the mountain, commencing at an elevation of about 100 feet, and extending to nearly 900 feet; and it took him and his companions more than a day to traverse it.

Uncinia brevicaulis, Thouars, var. *robustior*. (Plate XLV.)

Uncinia brevicaulis, Thouars, var. *robustior*, Hemsl.
Uncinia rigida, Bœckl. in Flora, 1882, p. 641
Uncinia gracilis, Thouars, β. *gracilis* [sic.], C. B. Clarke in Journ. Linn. Soc. Lond., xx. p. 400.

St Paul and Amsterdam. *De l'Isle*, 7 and 44.

Also in Tristan da Cunha.

De l'Isle collected the plant figured in Amsterdam Island at an elevation of above 600 feet; and he collected a smaller specimen on the south coast of St Paul. For particulars of it see *ante*, p. 159.

Uncinia compacta, R. Br.

Uncinia compacta, R. Br., Prodr. Fl. Nov. Holl., p. 241; Hook. f., Fl. Tasm., ii. p. 103, t. 153; C. B. Clarke in Journ. Linn. Soc. Lond., xx. p. 394.

St Paul Island.—Beginning at an altitude of about 650 feet—*De l'Isle*, 34.

Kerguelen Island; New Zealand; Tasmania; Alps of Victoria, Australia.

Var. δ *elongata*, C. B. Clarke in Journ. Linn. Soc. Lond., xx. p. 395.

Amsterdam Island. *De l'Isle*, 55.

GRAMINEÆ.

Spartina arundinacea, Carmich.

Spartina arundinacea, Carmich. in Trans. Linn. Soc. Lond., xii. p. 504; Kunth, Enum., i. p. 279; Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 31.
Ponceletia arundinacea, Thouars, Esquisse Fl. Trist., p. 36.

St Paul Island.—Abundant on the bank around the basin—*Milne;* scattered, and not very common—*Jelinek;* common—*De l'Isle*. Amsterdam Island.—Exceedingly abundant.

Apparently restricted to these islands and the Tristan da Cunha group. There is an allied species on the eastern coast of South America.

Trisetum insulare, Hemsl. (Plate LII.)

Trisetum insulare, Hemsl., n. sp.
Danthonia radicans, Steudel (?) Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 31.

Cæspitosum, foliis brevibus confertis late vaginantibus, paniculis densis abbreviatis, spiculis bifloris, gluma florenti longe bisetosa cum arista inter setas terminali.

Perenne, stoloniferum, undique glabra, stolonibus brevibus. *Culmi* adscendentes, graciliusculi, 9–18 poll. longi, supra paucifoliati. *Folia* tenuia, lævia vel margine leviter scabrida, plana, basi latiuscula (2–2½ lineas), acutissima, absque-vagina 1–3 poll. longa, in loco ligulæ ciliolata. *Paniculæ* compactæ, 1½–3 poll. longæ, ¾–1½ poll. latæ, longiuscule pedunculatæ; spiculæ breviter graciliterque pedicellatæ, 2-floræ, cum aristis 7–8 lineas longæ. *Flores* hermaphroditi, basi pilosuli; glumæ scariosæ, uninerviæ, 2 exteriores lanceolatæ, longe acuminatæ vel pseudoaristatæ, carinatæ, secus carinam leviter scabridæ; gluma florens absque aristis exsertis duplo brevior, apice triaristata, vel bisetosa cum arista inter setas terminalis, arista propria torta, geniculata, setas laterales triplo superans; palea angustissima glumam æquans; stamina 3. *Caryopsis* libera, anguste oblonga, glabra.

St Paul.—Endemic. Frequent in the low grounds, rare on the summit—*MacGillivray* and *Milne;* without locality—*Lieut. A. J. Smith;* the earliest flowering plant in the island—*De l'Isle*, 1.

We suspect this is the plant referred to by Reichardt under the above name, though it is perfectly distinct from the typical plant in Kew Herbarium. We have placed it in the genus *Trisetum* in spite of its having a terminal instead of a dorsal awn, because we believe that *Danthonia* must eventually be reduced to the former genus. Among plants in the two genera there exists every gradation from a strictly dorsal awn to a terminal one, as in our plant, between the two lateral setæ. *Trisetum insulare* is most nearly allied to the South African *Danthonia papillosa*, Trin., which, however, is a very hairy plant. *Aira pictigluma*, Steud., now referred to *Trisetum*, is a very similar plant from the mountains of Tropical Africa. There are two flowered species with a dorsal awn, and there are two flowered species with a terminal awn in both genera; and as the genera have been limited, one finds the same range of variation and parallel forms in the two.

Agrostis difficilis, Hemsl. (Plate XLIII.)

Agrostis difficilis, Hemsl., n. sp.

Cæspitosus, erectus, glaber, lævis, foliis teniusculis planis, spiculis minutis, glumis muticis exterioribus fere æqualibus.

Perennis, 1½–2 pedalis, culmis graciliusculis. *Folia* radicalia non visa, caulina acuta, 3–6 poll. longa, ligula ampla, integra, rotundata. *Paniculæ* graciles, angustæ, pedicellis parcissime et minutissime puberulis. *Glumæ* glabræ, vel exteriores pilis paucissimis secus carinam instructæ, acutæ; florens paulo brevior, obtusa, integra; palea obtusa; stamina 3. *Caryopsis* matura non visa.

Amsterdam Island.—Endemic. Rather common in humid parts of the low ground —*De l'Isle*, 37.

This very ordinary-looking grass has given us great trouble, and may after all turn out to be some common species, though we have failed to match it. In many respects it is like *Agrostis vulgaris*, and still more in aspect like *Agrostis canina;* but the total absence of an awn on the flowering glume removes all doubt as to its not being the latter, and we cannot think it is a variety or state of the former.

Agrostis delislei, Hemsl. (Plate XLIV.)

Agrostis delislei, Hemsl., n. sp.

Cæspitosa, erecta, foliis brevibus margine scabridis, paniculis angustis, gluma florifera longe aristata basi extus barbata.

Perennis, 9–15 poll. alta, fere ubique glabra. *Folia* culmo multo breviora, crassiuscula sed vix coriacea, obtusiuscula, siccitate marginibus involuta; ligula ampla, integra, obtusa vel fere rotundata. *Paniculæ* subsessiles vel pedunculatæ, pedicellis pilis minutis rigidiusculis instructis. *Glumæ* exteriores subæquales, florenti duplo longiores, acutæ; gluma florens bifida, basi barbata, dorso longe aristata, arista recta; palea paulo brevior, oblonga; stamina 3, marcida. *Caryopsis* non visa.

Amsterdam Island.—Among *Sphagnum* at about 600 feet—*De l'Isle*, 33.

In structure this species approaches very near to *Agrostis media*, from Tristan da Cunha.

Poa novaræ, Reichardt.

Poa novaræ, Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 31.

St Paul Island.—Summit of the mountain—*Milne;* constituting the basis of the vegetation, especially in the interior of the crater—*De l'Isle*, 4. Amsterdam Island.—Maritime region up to where *Isolepis nodosa* begins—*Vélain*.

CRYPTOGAMÆ.—VASCULARES.

LYCOPODIACEÆ.

Lycopodium trichiatum, Bory.

Lycopodium trichiatum, Bory, Voy. Dans les Iles d'Afr., p. 350; Spring, Monogr. Lycopod., partie i., p. 91, et partie ii., p. 43; Fournier in Comptes rendus, 1875, lxxxi. p. 1141.

Amsterdam Island.—*De l'Isle*.

Also recorded from Tropical America and Bourbon.

We have not seen any *Lycopodium* from Amsterdam which could be referred to this species or variety, for *Lycopodium trichiatum* is regarded by many botanists as a variety of the widely spread *Lycopodium clavatum*, Linn. It is included here on the authority of

Fournier. The form from all the other islands is *Lycopodium clavatum*, Linn., var. *magellanicum*.

Lycopodium cernuum, Linn.

Lycopodium cernuum, Linn.; Spring, Monogr. Lycopod., partie i., p. 79, et partie ii., p. 37; Fournier in Comptes rendus, 1875, lxxxi., p. 1140; Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 30.

St Paul Island.—Near hot springs—*Milne; De l'Isle.*

Widely diffused in warm countries, including Ascension and St Helena, though not the Tristan da Cunha group.

Milne (MSS. in Kew Library) states that this grew in soil at a temperature of 114° Fahr.

Lycopodium saururus, Lam.

Lycopodium saururus, Lam., Encycl. Bot., iii. p. 653; Spring, Monogr. Lycopod., partie i., p. 21, et partie ii., p. 6.

Lycopodium insulare, Carmich. in Trans. Linn. Soc. Lond., xii. p. 509; Fournier in Comptes rendus, 1875, lxxxi. p. 1141.

Lycopodium axillare, Roxb. in Beatson's St. Helena Tracts, p. 312.

Amsterdam Island.—*De l'Isle.*

Widely dispersed in Africa and America, and occurring in most of the islets from Ascension to Kerguelen.

FILICES.

Gleichenia polypodioides, Sm.

Gleichenia polypodioides, Sm. in Act. Taur., v. p 419; Hook., Sp. Fil., i. p. 3; Schkuhr., Fil., t. 149; Hook. and Bak., Synop. Fil., p. 11; Kuhn, Fil. Afr., p. 167.

Gleichenia argentea, Kaulf., Enum. Fil., p. 36; Fournier in Comptes rendus, 1875, lxxxi. p. 1141.

Amsterdam Island.—Very abundant from an elevation of about 600 feet up to nearly 1650 feet—*De l'Isle.*

Previous to its discovery in Amsterdam Island, this fern was regarded as an endemic African species. It is one of the commoner ferns in South Africa, extending northward to Angola. Fournier records it from Australia, but among the copious specimens of this species at Kew there is none from that country. Indeed, there is not a single species of the subgenus *Eugleichenia* common to Australia and South Africa; and this subgenus is confined to the Old World, while the subgenus *Mertensia* is generally spread in warm countries, *Gleichenia* (*Mertensia*) *dichotoma* being almost universal. It is noteworthy that *Gleichenia polypodioides* is the only species of the genus represented in our insular floras from the Bermudas to Kerguelen Island. The Amsterdam specimens collected by De l'Isle have fronds from six to seven inches high.

Hymenophyllum obtusum, Hook. et Arn.

Hymenophyllum obtusum, Hook. et Arn., Bot. Beechy's Voyage, p. 109; Hook., Sp. Fil., i. p. 93.
Hymenophyllum capillare, Desv.; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island.—In clefts and caverns at 500 to 600 feet—*De l'Isle*, 25.

Polynesia; South Africa.

Fournier identifies the Amsterdam plant with *Hymenophyllum capillare*, Desv. (*Hymenophyllum lineare*, Swartz), while Baker, in Kew Herbarium, has written it up as *Hymenophyllum obtusum*. These species and the *Hymenophyllum æruginosum* of the Tristan da Cunha group are very closely allied, and pteridologists are not agreed as to their limits, as appears from Kuhn (Filices Africanæ, p. 38). See note under *Hymenophyllum æruginosum*, ante, p. 162. *Hymenophyllum obtusum* was founded on Hawaian specimens.

Hymenophyllum tunbridgense, Smith, *β. wilsoni*, Hook. and Bak.

Hymenophyllum tunbridgense, Smith, *β. wilsoni*, Hook. and Bak., Synop. Fil., p. 67.
Hymenophyllum meyeri, Presl, Hymen., p. 50; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island. *De l'Isle.*

The form of this widely spread fern found in Amsterdam is identified by Fournier with one which also occurs in South Africa, which, however, is not accorded even varietal rank by Hooker and Baker.

Trichomanes saxifragoides, Presl.

Trichomanes saxifragoides, Presl, Hymen., pp. 16 et 39; Van den Bosch, Synop. Hymen., reprint, p. 13; Hook. and Bak., Synop. Fil., p. 75; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island. *De l'Isle.*

Japan; Ceylon; Java; Borneo; New Guinea; Polynesia.

Lomaria alpina, Spreng.

Lomaria alpina, Spreng.; Hook. f., Fl. Antarct., ii. p. 393, t. 150; Hook. and Bak., Synop. Fil., p. 178; Mett. in Reise der "Novara," Bot., i. p. 209; Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 29.
Lomaria penna-marina, Mett. in Kuhn Fil. Afr., p. 92; Baker in Mart. Fl. Bras. Polypod., p. 414; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island.—From the lowlands to the summit—*De l'Isle*, 48. St Paul Island. *Milne; De l'Isle; Jelinek.*

All round the south temperate zone.

Blechnum australe, Linn.

Blechnum australe, Linn.; Hook. and Bak., Synop. Fil., p. 186; Fournier in Comptes rendus, 1875, lxxxi. p. 1140; Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi. Abhandl. p. 29.
Blechnum hastatum, Kaulf., Enum. Fil., p. 161.

Amsterdam Island. *De l'Isle.* St Paul Island. *De l'Isle*, 6; *Jelinek.*

Mascarene Islands; South Africa; Southern Islands, from Tristan da Cunha eastward to the present, and temperate South America. Perhaps also in Ascension.

The fern referred to by Sir Joseph Hooker (Journ. Linn. Soc. Lond., xiv. p. 477) as a species of *Lomaria* is probably *Blechnum australe*, but we have not been able to find the specimen. It was a fragment of a frond, without fructification, from a root torn up by Commodore Goodenough on the occasion of his hurried visit to Amsterdam Island, and forwarded with the *Phylica* to Kew by Wykeham Perry, Esq., R.N., of H.M.S. "Pearl," with the promise, that if the plant should put forth new fronds, he would communicate them. On the other hand, although the island has since been pretty thoroughly botanised, it is possible that *Lomaria boryana* may exist there.

Asplenium furcatum, Thunb.

Asplenium furcatum, Thunb., Prodr. Fl. Cap., p. 735; Hook. and Bak., Synop. Fil., p. 214; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island. *De l'Isle.*

Common and widely diffused in warm countries, including St Helena and South Trinidad.

Nephrodium villosum, Presl.

Nephrodium villosum, Presl; Hook., Sp. Fil., iv. p. 134, t. 264; Hook. and Bak., Synop. Fil. p. 286.
Phegopteris bivestita, Fournier in Comptes rendus, 1875, lxxxi. p. 1140, non Mett.

St Paul Island. *De l'Isle.*

A very common fern throughout Tropical America and the West Indies, and extending to the Galapagos, but not previously recorded from any other part of the world. We have cited the *Phegopteris bivestita* of Fournier's enumeration as a synonym of this, because a specimen in Kew Herbarium from St Paul Island, collected by De l'Isle, and named *Phegopteris bivestita*, is certainly not the plant described by Mettenius. Mr Baker is responsible for its being referred to *Nephrodium villosum*.

Nephrodium aquilinum, Hemsl. (Plate XXXIX.)

Nephrodium aquilinum, Hemsl., *ante*, p. 167.
Polypodium aquilinum, Thouars, Esquisse Fl. Trist., p. 32.
Phegopteris aquilina, Mett. in Kuhn Fil. Afr., p. 121; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island. *De l'Isle.*

This was not in the set of De l'Isle's plants sent to Kew, and we have only seen specimens from the Tristan da Cunha group; but we have no reason to doubt the correctness of Fournier's determination; and, if correct, it is one more link in the chain of evidence tending to prove the common origin of the vegetation of these distant islands.

Nephrodium (Lastrea) filix-mas, Rich.

Nephrodium (*Lastrea*) *filix-mas*, Rich. ex Desv. in Mém. Soc. Linn. Par., vi. p. 260; Hook., Sp. Fil., iv. p. 116; Hook., Fil. Exot., t. 98; Hook., Ic. Fil., t. 234; Hook. and Bak., Synop. Fil., p. 272.
Nephrodium (*Lastrea*) *antarcticum*, Baker in Journ. Linn. Soc. Lond., xiv. pp. 479 et 480.
Aspidium antarcticum, Fourn., et A. *dilatatum*, Fournier in Comptes rendus, 1875, lxxxi. p. 1140?
Aspidium oppositum, Kaulf., var. *indusio minuto*, Mett. in Reise der Novara, Bot., i. p. 218, et Reichardt in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 30?

Amsterdam Island. *De l'Isle.* St Paul Island. *Sir G. Staunton;* in humid situations all over the island—*Jelinek.*

At Mr Baker's request we reduce his *Nephrodium antarcticum* founded on an imperfect specimen in the Herbarium of the British Museum collected by Sir G. Staunton. Since describing that he has had an opportunity of examining a specimen collected by De l'Isle, and sent to Kew from the Paris Herbarium under the name "*Aspidium dilatatum*, Swartz." He recognises it as a better specimen of the same species as his *Aspidium antarcticum*, and regards it as a variety of *Nephrodium filix-mas* with compound fronds similar to the var. *elongatum* of the Synopsis Filicum.

Nephrodium filix-mas is widely spread, and common in tropical and South Africa and the Mascarene Islands; yet it is noteworthy that it does not extend into extratropical South America, nor is it represented in Australia, New Zealand, or any of the other islands of the Southern Ocean.

Aspidium coriaceum, Swartz.

Aspidium coriaceum, Swartz, Prodr. Fl. Ind. Occ., p. 133, et Synop. Fil., p. 57; Hook. and Bak., Synop. Fil., p. 254.
Polystichum coriaceum, Schott in Presl Tent., p. 84; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island.—Abundant, fronds three feet high—*De l'Isle.*

Widely diffused in the southern hemisphere, chiefly in the extratropical regions.

Aspidium (Polystichum) mohrioides, Bory.

Aspidium (*Polystichum*) *mohrioides*, Bory in Duperr. Voy. Coquille, Bot. Crypt., p. 267, t. 35; Hook. f., Fl. Antarct., p. 392, t. 149; Hook., Sp. Fil., iv. p. 26; Hook. and Bak., Synop. Fil., p. 252.
Polystichum mohrioides, Presl, Tent., p. 83; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

Amsterdam Island.—Beginning at about 1400 feet, and ascending very little higher—*De l'Isle.*

California; Chili; Patagonia; Tierra del Fuego; Falkland Islands, and Marion Island.

Polypodium (Grammitis) australe, Mett.

Polypodium (*Grammitis*) *australe*, Mett., Polypod., p. 36; Hook., Sp. Fil., iv. p. 167; Hook. and Bak., Synop. Fil., p. 322.
Grammitis magellanica, Desv., Journ. Bot., iii. p. 275, t. 10, fig. 2; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

AMSTERDAM ISLAND. *De l'Isle.*

Generally diffused in the south temperate zone.

Polypodium serrulatum, Mett.

Polypodium serrulatum, Mett., Polypod., p. 32; Hook., Sp. Fil., iv. p. 174; Hook. and Bak., Synop. Fil., p. 323; Bak., Fl. Maurit., p. 504.
Micropteris serrulata, et *Micropteris orientalis*, Desv. in Mém. Soc. Linn. Par., vi. p. 217.
Xiphopteris serrulata, Kaulf., Enum. Fil., p. 85; Hook., Garden Ferns, t. 44.
Xiphopteris orientalis, Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

AMSTERDAM ISLAND. *De l'Isle.*

Generally diffused in the tropics, and extending into subtropical regions.

This is another fern of which we have seen no specimen from Amsterdam Island, and of which there is a specimen in Kew Herbarium from Bourbon, collected by De l'Isle; hence we think it may have got into Fournier's list by mistake. The distribution of the species, as illustrated in the rich Herbarium at Kew, supports this view, inasmuch as it is not found in extratropical South Africa; and we have seen no specimens of it from extratropical America, unless we include Juan Fernandez. On the other hand, the extraordinary range of *Phylica nitida*, as set forth in our enumeration of the plants of the Tristan da Cunha group, indicates an ancient connection between the vegetation of the Mascarene Islands and that of these southern islands.

Acrostichum succisæfolium, Thouars.

Acrostichum succisæfolium, Thouars, Esquisse Fl. Trist., p. 30; Hook. and Bak., Synop. Fil., p. 408; Fournier in Comptes rendus, 1875, lxxxi. p. 1140.

AMSTERDAM ISLAND.—Abundant at 600 feet—*De l'Isle.*

Previously only known from the Tristan da Cunha group.

Monogramme graminea, Schkuhr.

Monogramme graminea, Schkuhr., Krypt. Gew., p. 82; Hook. and Bak., Synop. Fil., p. 375.
Monogramme linearis, Kaulf., Enum. Fil., p. 196; Fournier in Comptes rendus, 1875, lxxxi. p. 1140; Hook., Sp. Fil., v. p. 122.

AMSTERDAM ISLAND. *De l'Isle.*

Cape of Good Hope, and Mascarene Islands.

We have not seen specimens of this fern from Amsterdam Island; but in Kew Herbarium there are specimens from Bourbon, collected by De l'Isle, and it is possible that it may have been inadvertently placed in Fournier's list of the Amsterdam species.

CRYPTOGAMÆ.—CELLULARES.

MUSCI.[1]

Sphagnum lacteolum, Besch.

Sphagnum lacteolum, Besch. in Comptes rendus, lxxxi. p. 724 (reprint, p. 5).

AMSTERDAM ISLAND. *De l'Isle.*

Sphagnum reichardtii, Hampe.

Sphagnum reichardtii, Hampe.; Reise der Novara, Bot., i. p. 166; Besch. in Comptes rendus, lxxxi. p. 722 (reprint, p. 3).

Sphagnum acutifolium, Ehrh.; Mitt. in Journ. Linn. Soc. Lond., xiv. p. 482.

ST PAUL ISLAND. *De l'Isle.*

Funaria calvescens, Schwägr.

Funaria calvescens, Schwägr.; C. Müll., Synop. Musc. Frond., i. p. 107; Besch. in Comptes rendus, lxxxi. p. 724 (reprint, p. 5).

Funaria hygrometrica, Hedw., var. *calvescens*, Hook. f. et Wils.

AMSTERDAM ISLAND. *De l'Isle.*

Polytrichum formosum (?), Hedw.

Polytrichum formosum (?), Hedw.; Besch. in Comptes rendus, lxxxi. p. 724 (reprint, p. 5).

AMSTERDAM ISLAND. *De l'Isle.*

Bryum isleanum, Besch.

Bryum isleanum, Besch. in Comptes rendus, lxxxi. p. 724 (reprint, p. 5).

ST PAUL and AMSTERDAM ISLANDS. *De l'Isle.*

Webera nutans, Hedw.

Webera nutans, Hedw.; Besch. in Comptes rendus, lxxxi. p. 722 (reprint, p. 3).

Bryum (Webera) nutans, Schreb., Fl. Lips., p. 81; Mitt. in Journ. Linn. Soc. Lond., xiv. p. 482.

Bryum laxum, Reichdt. in Reise der Novara, Bot., i. p. 176, t. 31.

ST PAUL and AMSTERDAM ISLANDS. *De l'Isle.*

Campylopus megalotus, Besch.

Campylopus megalotus, Besch. in Comptes rendus, lxxxi. p. 721 (reprint, p. 2).

ST PAUL ISLAND. *De l'Isle.*

[1] Chiefly from Bescherelle's enumeration of the species collected by the French expedition, Comptes rendus, lxxxi.

Campylopus clavatus, R. Br.

Campylopus clavatus, R. Br.; Hook. f., Handb. New Zealand Fl., p. 414; Schwægr., Suppl., t. 255; Mitt. in Journ. Linn. Soc. Lond., xiv. p. 481; Besch. in Comptes rendus, lxxxi. p. 721 (reprint, p. 2).
Campylopus flexuosus, Brid. ex Hook. f. in Fl. Antarct., p. 408?

St Paul Island. *Milne.*

Campylopus falcifolius, Mitt.

Campylopus falcifolius, Mitt. in Journ. Linn. Soc. Lond., xiv. p. 481; Besch. in Comptes rendus, lxxxi. p. 721 (reprint, p. 2).

St Paul Island. *Milne*, 23; *Strange*; *De l'Isle.*

Campylopus eximius, Reichdt.

Campylopus eximius, Reichdt. in Reise der Novara, Bot., i. p. 167, t. 28; Besch. in Comptes rendus, lxxxi. p. 721 (reprint, p. 2).
Campylopus introflexus, Mitt. in Journ. Linn. Soc. Lond., xiv. p. 481.
Dicranum introflexum, Hedw., Sp. Musc., t. 29.

St Paul Island. *Milne.*

Campylopus minor, Besch.

Campylopus minor, Besch. in Comptes rendus, lxxxi. p. 723 (reprint, p. 4).

Amsterdam Island. *De l'Isle.*

Campylopus cornatulus, Besch.

Campylopus cornatulus, Besch. in Comptes rendus, lxxxi. p. 723 (reprint, p. 4).

Amsterdam Island. *De l'Isle.*

Dicranum subconfine, Besch.

Dicranum subconfine, Besch. in Comptes rendus, lxxxi. p. 723 (reprint, p. 4).

Amsterdam Island. *De l'Isle.*

Dicranum fulvastrum, Besch.

Dicranum fulvastrum, Besch. in Comptes rendus, lxxxi. p. 723 (reprint, p. 4).

Amsterdam Island. *De l'Isle.*

Dicranella pyrrhotricha, Besch.

Dicranella pyrrhotricha, Besch. in Comptes rendus, lxxxi. p. 721 (reprint, p. 2).

St Paul Island. *De l'Isle.*

Trematodon setaceus, Hampe.

Trematodon setaceus, Hampe. MS.; Besch. in Comptes rendus, lxxxi. p. 721 (reprint, p. 2).

St Paul Island. *De l'Isle.*

Philonotis trichophylla, Besch.

Philonotis trichophylla, Besch. in Comptes rendus, lxxxi. p. 724 (reprint, p. 5).

Amsterdam Island. *De l'Isle.*

Syrrhopodon isleanus, Besch.

Syrrhopodon isleanus, Besch. in Comptes rendus, lxxxi. p. 722 (reprint, p. 3).

St Paul Island. *De l'Isle.*

Trichostomum (Leptodontium) interruptum, Besch.

Trichostomum (*Leptodontium*) *interruptum*, Besch. in Comptes rendus, lxxxi. p. 723 (reprint, p. 4).
Didymodon interruptus, Mitt. in Hook. f., Handb. Fl. N. Zeal., p. 421.

Amsterdam Island. *De l'Isle.*

Trichostomum (?) perangustum, Besch.

Trichostomum (*?*) *perangustum*, Besch. in Comptes rendus, lxxxi. p. 723 (reprint, p. 4).

Amsterdam Island. *De l'Isle.*

Barbula muralis, Hedw.

Barbula muralis, Hedw.; Reichdt. in Reise der Novara, Bot., i. p. 173; Besch. in Comptes rendus, lxxxi. p. 722 (reprint, p. 3).

St Paul Island. *Reichardt.*

Ceratodon calycinus, Hampe.

Ceratodon calycinus, Hampe.; Reichdt. in Reise der Novara, Bot., i. p. 172; Besch. in Comptes rendus, lxxxi. p. 72 (reprint, p. 3).
Ceratodon purpureus, Mitt. in Journ. Linn. Soc. Lond., xiv. p. 481.
Mnium purpureum, Linn., Sp. Pl., ed. 2, p. 1575.

St Paul Island. *De l'Isle.*

Racomitrium pruinosum, Besch.

Racomitrium pruinosum, Besch. in Comptes rendus, lxxxi. p. 723 (reprint, p. 4).
Racomitrium lanuginosum, C. Müll., Mittheilung, 1869.
Racomitrium lanuginosum, var. *pruinosum*, Hook. f. et Wils., Fl. N. Zeal., ii. p. 76, et Hook. f., Handb. Fl. N. Zeal., p. 427.

Amsterdam Island. *De l'Isle.*

Entodon pallidus, Mitt.

Entodon pallidus, Mitt. in Seem. Fl. Vit., p. 398; Besch. in Comptes rendus, lxxxi. p. 722 (reprint, p. 3).

St Paul Island. *Strange.*

Hypnum (Cupressina) compressulum, Besch.

Hypnum (Cupressina) compressulum, Besch. in Comptes rendus, lxxxi. p. 724 (reprint, p. 5).

Amsterdam Island. *De l'Isle.*

Rhaphidorrhynchum aurescens, Besch.

Rhaphidorrhynchum aurescens, Besch. in Comptes rendus, lxxxi. p. 724 (reprint, p. 5).

Amsterdam Island. *De l'Isle.*

Rhaphidorrhynchum (Trichosteleum) confertulum, Besch.

Rhaphidorrhynchum (Trichosteleum) confertulum, Besch. in Comptes rendus, lxxxi. p. 722 (reprint, p. 3).

St Paul Island. *De l'Isle.*

Rhaphidorrhynchum contiguum, Hook. f. et Wils.

Rhaphidorrhynchum contiguum, Hook. f. et. Wils.; Besch. in Comptes rendus, lxxxi. p. 722 (reprint, p. 3).

Sematophyllum contiguum, Mitt. in Seem. Fl. Vit., p. 398.

St Paul Island. *Strange.*

HEPATICÆ.

Anthoceros lævis, Linn.

Anthoceros lævis, Linn.; Reichdt. in Reise der Novara, Bot., i. p. 147; Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 28.

St Paul Island.

Marchantia polymorpha, Linn.

Marchantia polymorpha, Linn.; Reichdt. in Reise der Novara, Bot., i. p. 151; Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi. Abhandl. p. 28.

St Paul Island.

Lophocolea jelinekii, Reichdt.

Lophocolea jelinekii, Reichdt. in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xvii. (1867), Abhandl. p. 959, et in Reise der Novara, Bot., i. p. 160.

St Paul Island.

Alicularia scalaris, Corda.

Alicularia scalaris, Corda; Reichdt. in Reise der Novara, Bot., i. p. 165; Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, xxi., Abhandl. p. 28.

St Paul Island.

LICHENES.

Stereocaulon proximum, Nyl.

Stereocaulon proximum, Nyl. in Comptes rendus, lxxxi. p. 726 (reprint, p. 7).

Amsterdam Island. *De l'Isle.*

Parmelia præperlata, Nyl.

Parmelia præperlata, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Parmelia confluescens, Nyl.

Parmelia confluescens, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Peltigera dolichorhiza, Nyl.

Peltigera dolichorhiza, Nyl. in Comptes rendus, lxxxi. p. 726 (reprint, p. 7).

Amsterdam Island. *De l'Isle.*

Physcia parietina, forma *aureola* (Acharius).

Physcia parietina, forma *aureola* (Acharius); Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Physcia saxicola, Nyl.

Physcia saxicola, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Lecanora fulgescens, Nyl.

Lecanora fulgescens, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Opegraphia consimillima, Nyl.

Opegraphia consimillima, Nyl. in Comptes rendus, lxxxi. p. 726 (reprint, p. 7).

St Paul Island. *De l'Isle.*

Stigmatidium leucolytum, Nyl.

Stigmatidium leucolytum, Nyl. in Comptes rendus, lxxxi. p. 726 (reprint, p. 7).

St Paul Island. *De l'Isle.*

Verrucaria æthioboliza, Nyl.

Verrucaria æthioboliza, Nyl. in Comptes rendus, lxxxi. p. 726 (reprint, p. 7).

St Paul Island. *De l'Isle.*

Lecanora milvina, Wahlenb.

Lecanora milvina, Wahlenb.; Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Lecanora subsulphurata, Nyl.

Lecanora subsulphurata, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Urceolaria deuteria, Nyl.

Urceolaria deuteria, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Lecidea parasemops, Nyl.

Lecidea parasemops, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

Lecidea conioptoides, Nyl.

Lecidea conioptoides, Nyl. in Comptes rendus, lxxxi. p. 725 (reprint, p. 6).

St Paul Island. *De l'Isle.*

FUNGI.

There are no fungi in the English collections, and if the French or Austrians collected any, they have not, so far as we know, published them.

ALGÆ.

The following algæ are recorded from St Paul Island in the Reise der oesterreichischen Fregatte Novara, Grunow in Bot., i. pp. 29–94 :—

Hypheothrix laminosa, Cladophora hospita, Cladophora (*Spongomorpha*) *pectinella, Enteromorpha bertolonii, Enteromorpha fulvescens, Enteromorpha minima, Ectocarpus*

approximatus, Ectocarpus hinksiæ, Scytosiphon lomentarium, Asperococcus pusillus, Punctaria latifolia, Zonaria diesingiana, Desmarestia chordalis, Laminaria pallida, Macrocystis pelagica, Ecklonia buccinalis, Porphyra cordata, Porphyra laciniata, Bangia versicolor, Callithamnium microptilum, Callithamnium pennula, Corynospora wüllerstorfiana, Griffithsia tasmanica, Ceramium parvulum, Schizymenia obovata, Shimmelmannia frauenfeldii, Epymenia obtusa, Gigartina livida, Gigartina runcinata, Callophyllis variegata, Callophyllis hombroniana, Gymnogongrus vermicularis, Rhodymenia linearis, Rhodymenia prolifera, Plocamium suhrii, Plocamium corallorhiza, Rhodophyllis capensis, Corallina officinalis, Corallina muscoides, Caulacanthus spinellus, Hypnea esperi, Gelidium cartilagineum, Suhria vittata, Suhria reptans, Gracilaria corniculata Dicurella flabellata, Nitophyllum uncinatum, Nitophyllum acrospermum, Nitophyllum affine, Delesseria dichotoma, Polysiphonia ceratocladia, Polysiphonia anisogona, Bostrychia mixta, Rytiphlæa cloiophylla, Rytiphlæa capensis, Chondriopsis capensis, Chondriopsis sedifolia, Sarcomenia intermedia.

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(*Synonyms and Names of Plants incidentally mentioned in italics*).

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PLATE XIV.

PLATE XIV.

Portions of branches and flowers of *Cereus insularis*, natural size.

Figure 1.—A cluster of spines.

,, 2.—An anther, with portion of the filament.

,, 3.—Apex of style with stigmas : all enlarged.

Drawn from a specimen in Kew Herbarium, collected by Mr Moseley.

M. Smith. del.

M.Farlane & Erskine, Lith.rs Edin.r

CEREUS INSULARIS, *Hemsl.*

PLATE XV.

PLATE XV.

Flower and fruit-bearing branches of *Gonolobus micranthus*, natural size.

Figure 1.—Portion of under surface of leaf.

„ 2.—A flower, perhaps too flat.

„ 3.—A calyx lobe, with two of the alternating glands.

„ 4.—Vertical section of the flower.

„ 5.—Portion of the corona.

„ 6.—Gynostegium.

„ 7.—A pair of pollinia.

„ 8.—A seed: all the figures more or less enlarged.

Drawn from a specimen in Kew Herbarium, collected by Mr Moseley.

M. Smith. del

GONOLOBUS MICRANTHUS, *Hook. f.*

PLATE XVI.

PLATE XVI.

Figure A.—Portion of a vigorous specimen of *Hedyotis adscensionis*, DC., natural size.

„ B.—A branch of a stunted plant of the same.

„ 1.—A leaf with its stipules.

„ 2.—A leaf seen from beneath.

„ 3.—A flower from the stunted plant (Fig. B.).

„ 4.—A flower from the more vigorous plant (Fig. A.).

„ 5.—Corolla of the short-tubed form laid open, showing the insertion of the stamens.

„ 6.—A style with stigma from the same.

„ 7.—Vertical section through a half-ripe fruit.

„ 8.—A ripe fruit in which the calyx has become quite glabrous.

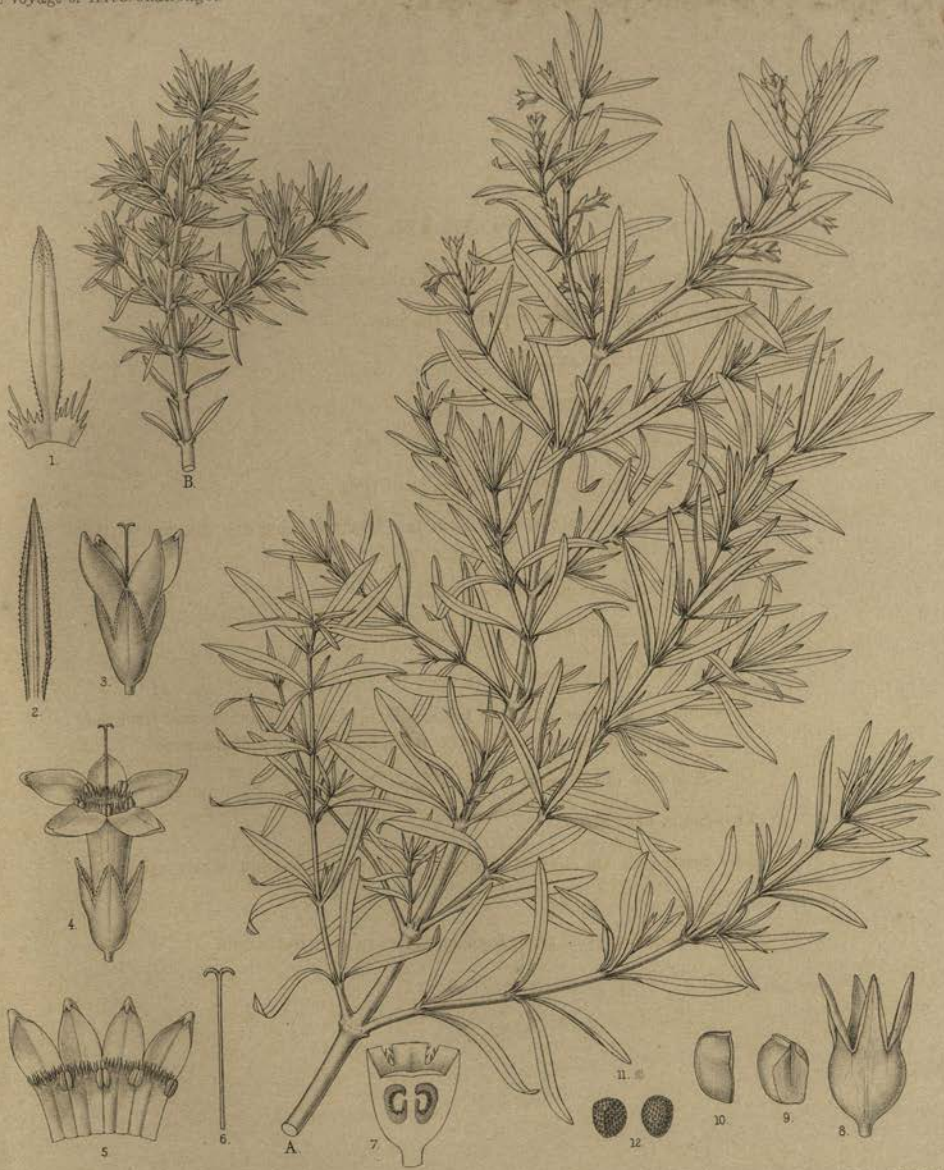
„ 9.—One of the carpels after it has separated from the exocarp, seen from the inner face, and showing the apical and loculicidal dehiscence.

„ 10.—Side view of the same.

„ 11.—Seeds, natural size.

„ 12.—Seeds: all the figures enlarged more or less, except where otherwise stated.

The drawings were made from specimens in Kew Herbarium.



M. Smith del.

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HEDYOTIS ADSCENSIONIS, *D.C.*

PLATE XVII.

PLATE XVII.

Portion of a plant of *Euphorbia origanoides*, natural size.

Figure 1.—Inflorescence.

„ 2.—Involucre and advanced female flower.

„ 3.—Portion of the involucre spread open, showing the thin fringed plates that project in towards the centre.

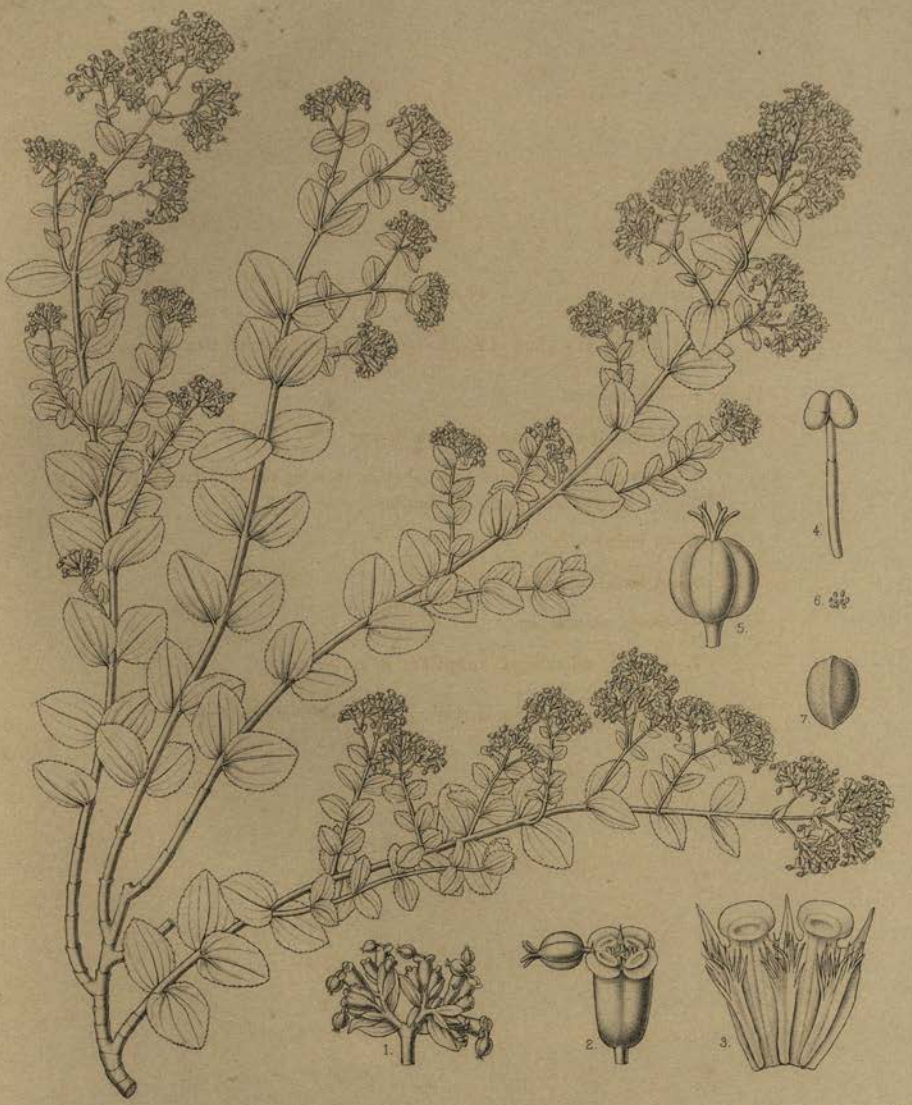
„ 4.—A male flower.

„ 5.—A mature capsule.

„ 6.—Seeds, natural size.

„ 7.—A seed : all enlarged except Fig. 6.

Drawn from a specimen in Kew Herbarium, collected by Mr Moseley.



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EUPHORBIA ORIGANOIDES, L.

PLATE XVIII.

PLATE XVIII.

A and B, the largest and the smallest plants respectively of *Fimbristylis* (*Oncostylis*) *neglecta*, in the Kew Herbarium, collected by Dr. Burchell ; both natural size.

Figure 1.—A section of a leaf.

„ 2.—A cluster of spikelets.

„ 3.—A single spikelet.

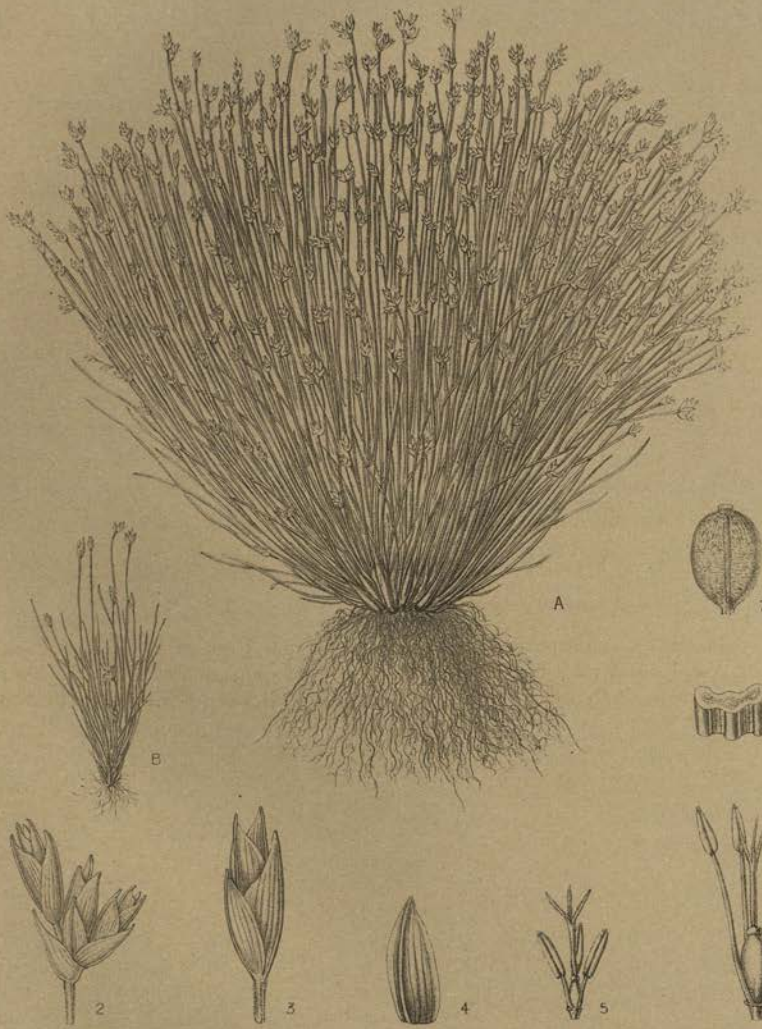
„ 4.—A glume.

„ 5.—A very young flower.

„ 6.—A flower further advanced.

„ 7.—A nut : all enlarged.

In Burchell's manuscript notes the spikelets of this plant are described as about 6-flowered, which was doubtless correct, for some of his specimens, from which the lower flowers have mostly fallen away, probably bore quite as many as six flowers in each spikelet.



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FIMBRISTYLIS (ONCOSTYLIS) NEGLECTA. *Hemsl.*

PLATE XIX.

PLATE XIX.

A and B, plants of *Fimbristylis* (*Oncostylis*) *lichtensteiniana*, both natural size.

Figure 1.—Portion of a culm with basal sheaths, from the plant A.

,, 2.—A head of spikelets.

,, 3.—A glume, from the same plant.

,, 4.—Portion of a culm with basal sheaths, from the plant B.

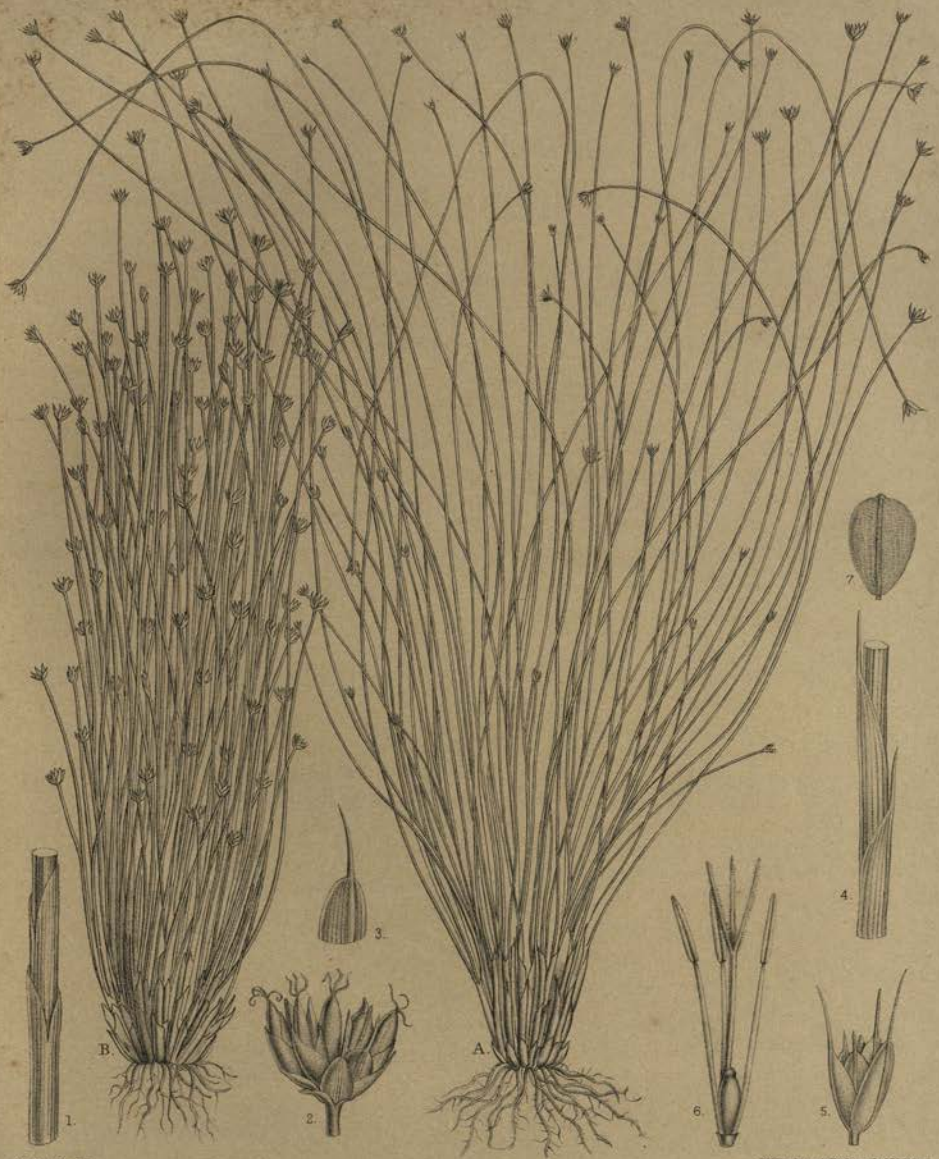
,, 5.—A head of spikelets.

,, 6.—A flower.

,, 7.—A nut, from the same plant: all enlarged.

The drawing A represents a plant in Kew Herbarium collected by Dr Burchell; and B, a plant collected by Sir Joseph Hooker.

The two forms are very different in appearance, and at first sight would be taken for distinct species. One has long, slender, flexible culms, with two or three, or sometimes even only one spikelet in each head; while the other has shorter, stouter, quite rigid culms, bearing heads of numerous spikelets. In the former the sheaths terminate in short leaves; in the latter they are quite truncate.



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FIMBRISTYLIS (Oncostylis) LICHTENSTEINIANA. *Hensl.*

PLATE XX.

PLATE XX.

Portions of a small frond of *Pteris paleacea*, natural size.

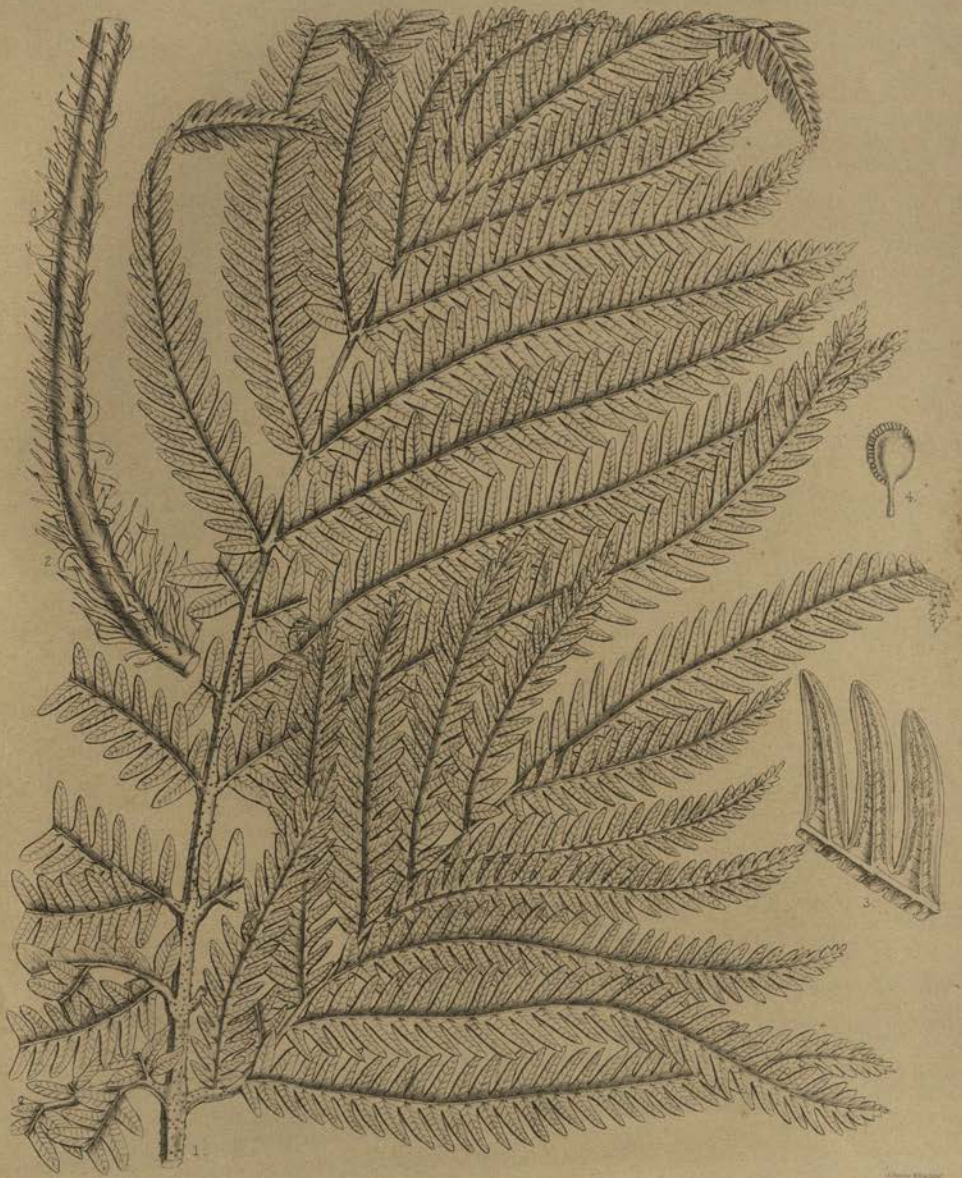
Figure 1.—The frond.

„ 2.—The stipes.

„ 3.—Three pinnules.

„ 4.—A sporangium, enlarged.

The drawing of the stipes is from a specimen in Kew Herbarium collected by Dr Burchell; and the other parts from a specimen collected by Dr Seemann.



PTERIS PALEACEA, *Roxb.*

PLATE XXI.

PLATE XXI.

Portions of rhizome and frond of *Asplenium platybasis*, natural size.

Figure 1.—Portion of a segment of the frond, enlarged.

Figures 2 and 3.—Sporangia, enlarged.

Drawn from a specimen in the Kew Herbarium from St Helena, collected by Dr Burchell.

M. Smith del. M.cFarlane & Erskine, Lith.rs Edin.r

ASPLENIUM PLATYBASIS, *Hemsl.*

PLATE XXII.

PLATE XXII.

Portions of fronds of *Asplenium* (*Diplazium*) *nigro-paleaceum*, natural size.

Figure 1.—Part of two pinnules, enlarged.

„ 2.—Part of a tertiary segment, more enlarged.

„ 3.—A sporangium, enlarged.

The stipes was drawn from a specimen in Kew Herbarium collected by Dr Burchell, and the other parts from a specimen collected by Captain Haughton.

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ASPLENIUM (DIPLAZIUM) NIGRO-PALEACEUM. *Braun*

PLATE XXIII.

PLATE XXIII.

A plant of *Cyperus* (*Papyrus*) *atlanticus*, natural size.

Figure 1.—A portion of a leaf from near the apex.

„ 2.—A spikelet.

„ 3.—A glume with its basal appendages as it tears from the rhachis when young.

„ 4.—Portion of rhachis from which the glumes have fallen, leaving the persistent appendages.

„ 5.—A flower.

„ 6.—A nut: all the figures enlarged.

Drawn from a specimen in the Kew Herbarium, collected by Sir Joseph D. Hooker.

M. Smith del.

Mc Farlane & Erskine, Lith. Edin.

CYPERUS (Papyrus) ATLANTICUS, *Hemsl.*

PLATE XXIV.

PLATE XXIV.

Figures A. and B. plants of *Fimbristylis* (*Oncostylis*) *nesiotis*, natural size.

Figure 1.—Section of a leaf.

„ 2.—A spikelet.

„ 3.—Stamens and pistil from a very young flower.

„ 4.—Stamens and pistil from an expanded flower.

„ 5.—An anther.

„ 6.—A very young nut bearing the persistent enlarged base of the style: all the figures more or less enlarged.

Drawn from a specimen in the Kew Herbarium, collected by Sir Joseph D. Hooker.

M. Smith del. Mc Farlane & Erskine, Lith^rs Edin^r

FIMBRISTYLIS (Oncostylis) NESIOTIS, *Hemsl.*

PLATE XXV.

PLATE XXV.

Figure 1.—A branch of *Phylica nitida*, bearing male flowers, drawn from a specimen in Kew Herbarium, collected in Tristan da Cunha by Carmichael.

„ 2.—A branch bearing female flowers (or perhaps organically if not functionally bisexual flowers), from a specimen collected in Amsterdam Island by De l'Isle.

„ 3.—A barren branch, from a specimen collected by Mr Moseley in Inaccessible Island.

„ 4.—A fruit-bearing branch, from a specimen collected by Mr Moseley in Nightingale Island: all four figures natural size.

„ 5.—A young leaf seen from above.

„ 6.—The same seen from below.

„ 7.—A male flower.

„ 8.—A petal.

„ 9.—Front view of a stamen.

„ 10.—Back view of the same.

„ 11.—A stamen with an empty anther.

„ 12.—A female flower, from which the calyx lobes, petals, and sterile (?) stamens have been removed.

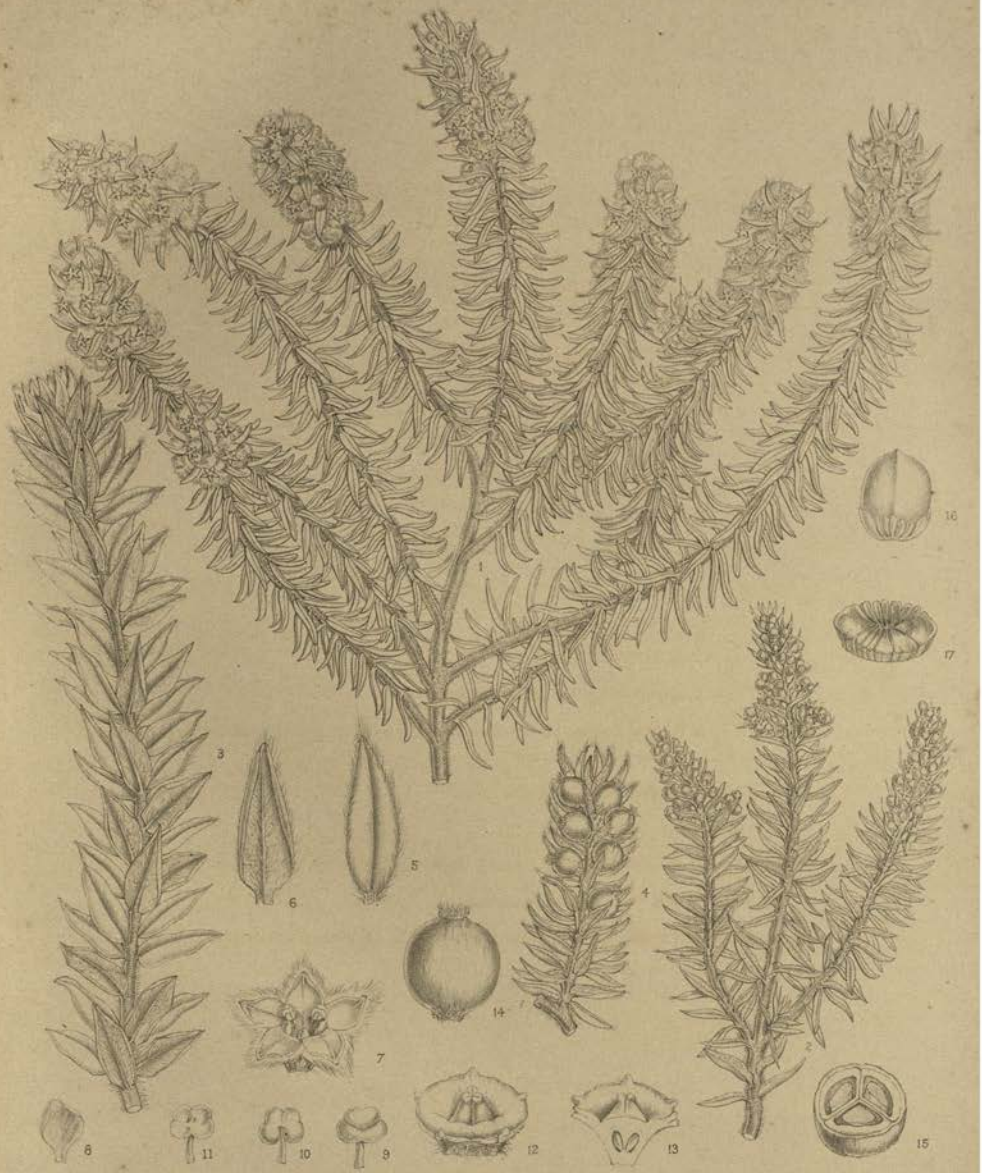
„ 13.—A vertical section of the same.

„ 14.—A ripe fruit.

„ 15.—A cross section of the same, showing that it separates into three cocci.

„ 16.—A seed with its aril attached.

„ 17.—Aril removed, seen from above: all the figures more or less enlarged.



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PHYLICA NITIDA. *Lamarck.*

PLATE XXVI.

PLATE XXVI.

A plant of *Gnaphalium pyramidale*, natural size.

Figure 1.—A capitulum.

„ 2.—One of the bracts of the involucre.

„ 3.—One of the outermost female flowers with a very narrow corolla.

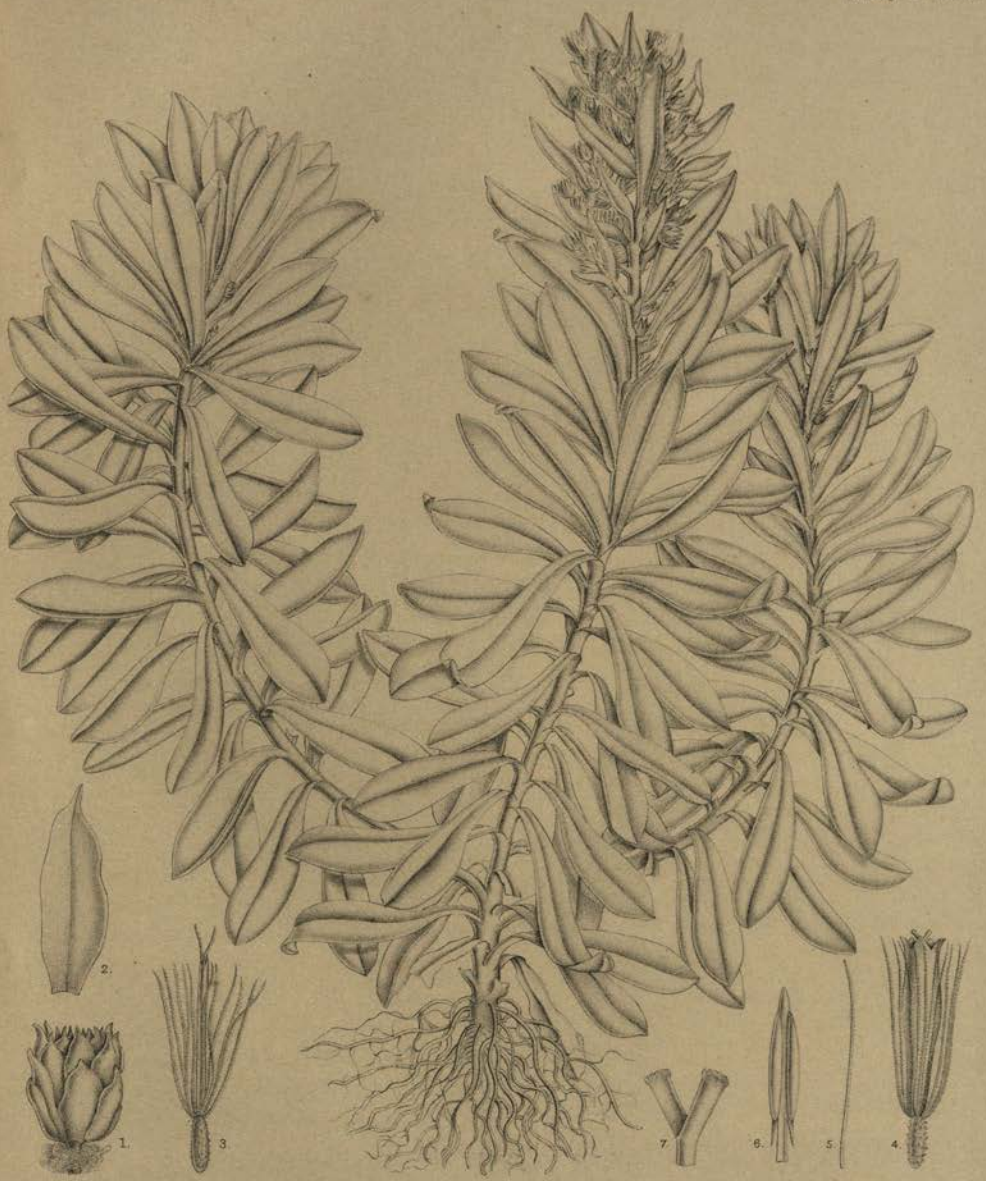
„ 4.—A central flower.

„ 5.—A bristle of the pappus.

„ 6.—A stamen.

„ 7.—Portion of style with stigmas: all enlarged.

Drawn from a specimen in Kew Herbarium from Inaccessible Island, collected by Mr Moseley.



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GNAPHALIUM PYRAMIDALE. *Thouars.*

PLATE XXVII.

PLATE XXVII.

A plant of *Cotula moseleyi*, natural size.

Figure 1.—Receptacle and part of the involucre.

„ 2.—One of the outer flowers.

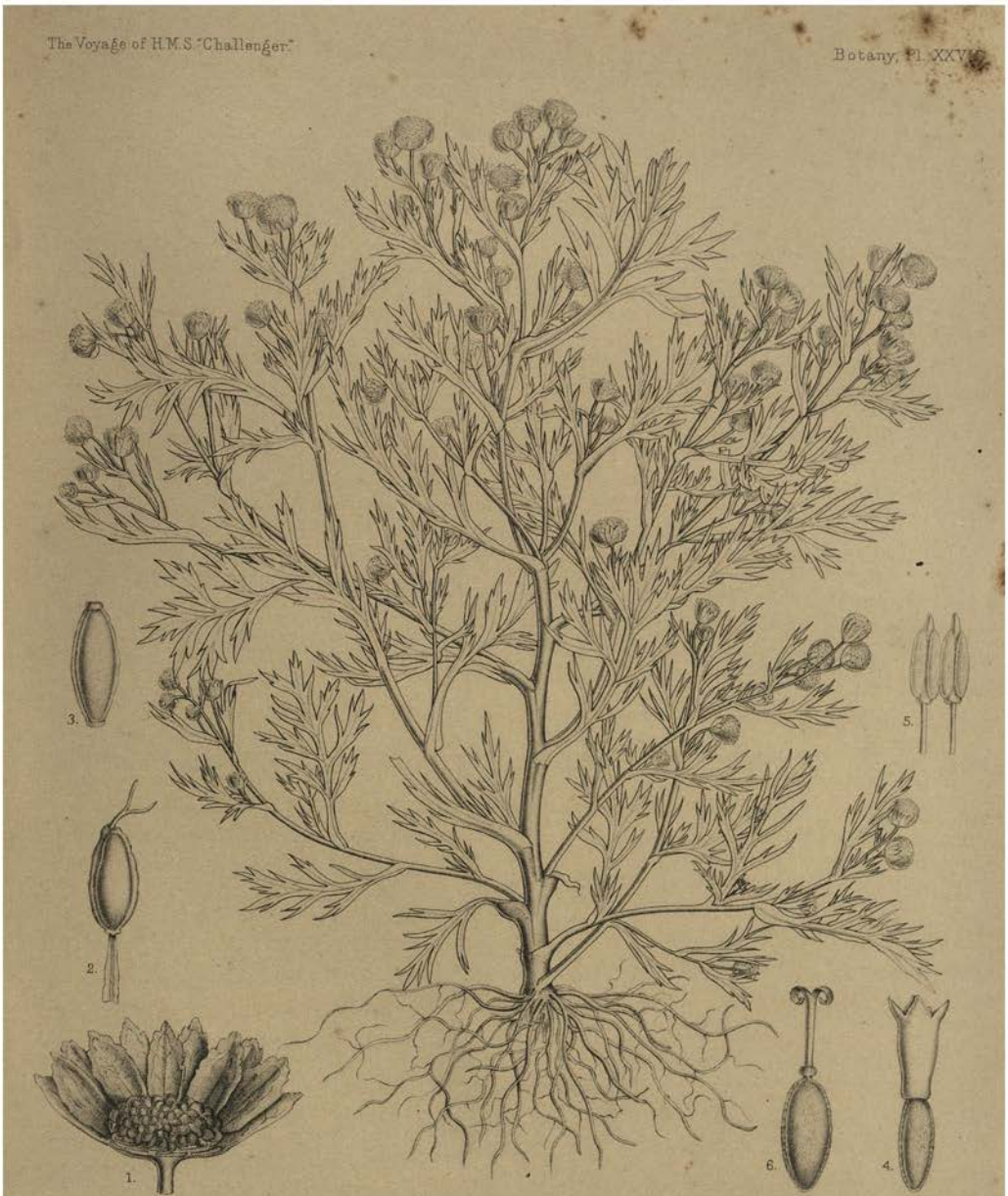
„ 3.—Achene of the same.

„ 4.—One of the inner flowers.

„ 5.—Two stamens from the same.

„ 6.—Pistil of the same.

Drawn from a specimen in Kew Herbarium, collected by Mr Moseley.



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COTULA MOSELEYI, *Hemsl.*

PLATE XXVIII.

PLATE XXVIII.

Portions of plants of *Chenopodium tomentosum*, natural size.

Figure 1.—Flowering branchlet.

„ 2.—A flower.

„ 3.—A flower fully expanded.

„ 4.—Back view of a stamen.

„ 5.—Front view of a stamen.

„ 6.—A pistil.

„ 7.—Fruit.

„ 8.—A seed.

„ 9.—Section of the same, showing the curved embryo.

„ 10.—Embryo removed: all enlarged.

The drawing was prepared from specimens in Kew Herbarium, collected by Carmichael, Milne, and Moseley

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CHENOPODIUM TOMENTOSUM, *Thouars.*

PLATE XXIX.

PLATE XXIX.

A plant of *Atriplex plebeja*, natural size.

Figure 1.—A cluster of female flowers, with one male flower.

„ 2.—A male flower.

„ 3.—Front view of a stamen.

„ 4.—Back view of a stamen.

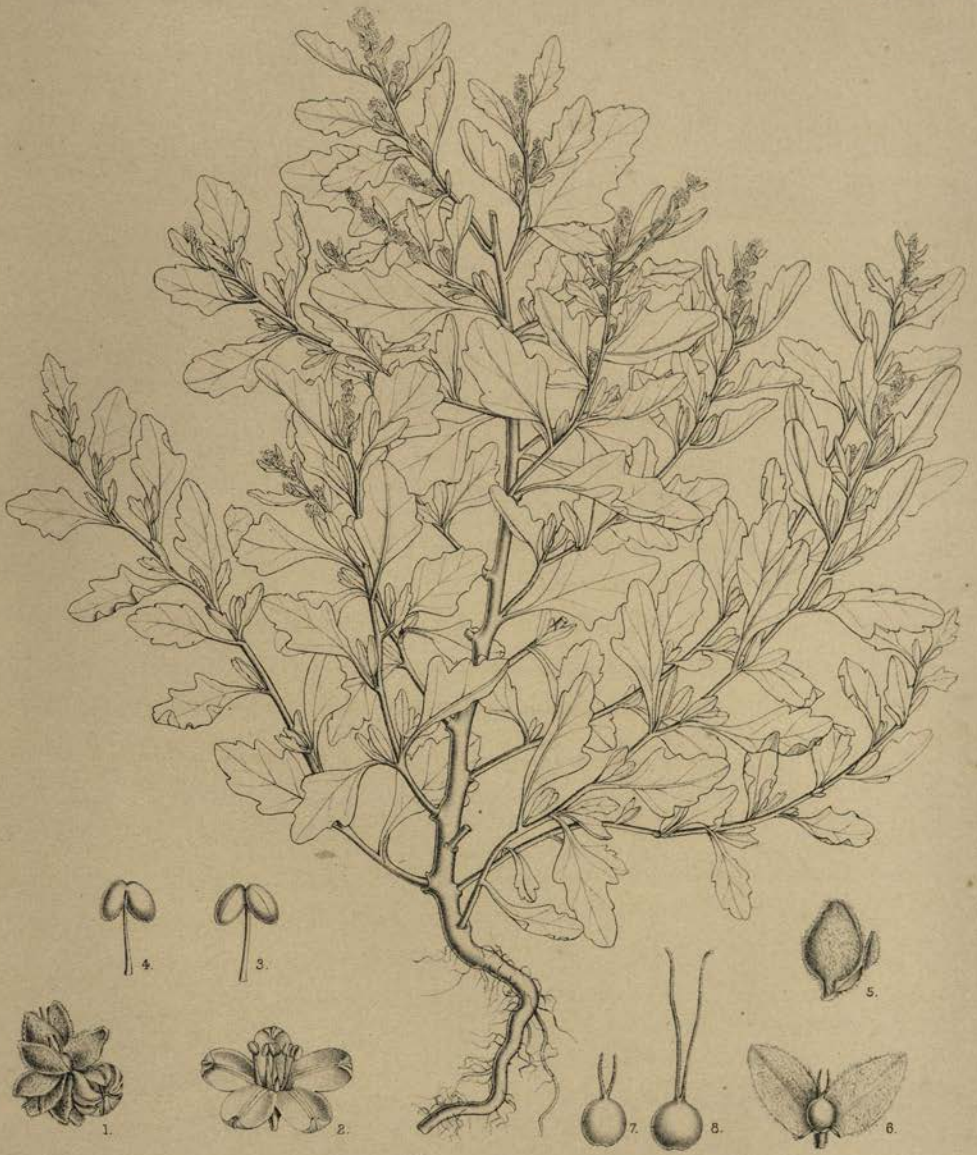
„ 5.—A female flower.

„ 6.—A young female flower, with the bracteoles partially removed.

„ 7.—A pistil in quite a young stage.

„ 8.—A pistil in a more advanced stage: all very much enlarged.

The drawing represents a specimen in Kew Herbarium, collected by Carmichael.



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ATRIPLEX PLEBEJA, *Carmich.*

PLATE XXX.

PLATE XXX.

An entire plant, except the root, of *Rumex frutescens*, with a branch in young fruit, both natural size.

Figure 1.—A cluster of flowers.

,, 2.—A single flower in bud.

,, 3.—An expanded flower.

,, 4.—A stamen.

,, 5.—A young fruit, showing the two perianth segments which are destitute of tubercles.

,, 6.—The same, showing the odd segment of the perianth bearing a tubercle.

The drawing of the entire plant, and the analysis of the flower, are from a specimen in Kew Herbarium, collected by Mr Moseley in Tristan da Cunha; and the fruiting branch with figures 5–6 from a specimen collected by Carmichael.

M. Smith del. McFarlane & Erskine, Lith^rs Edin^r

RUMEX FRUTESCENS, *Thouars*

PLATE XXXI.

PLATE XXXI.

A and B, a plant and portion of a plant of *Scirpus sulcatus*, natural size.

Figure 1.—A cluster of spikelets.

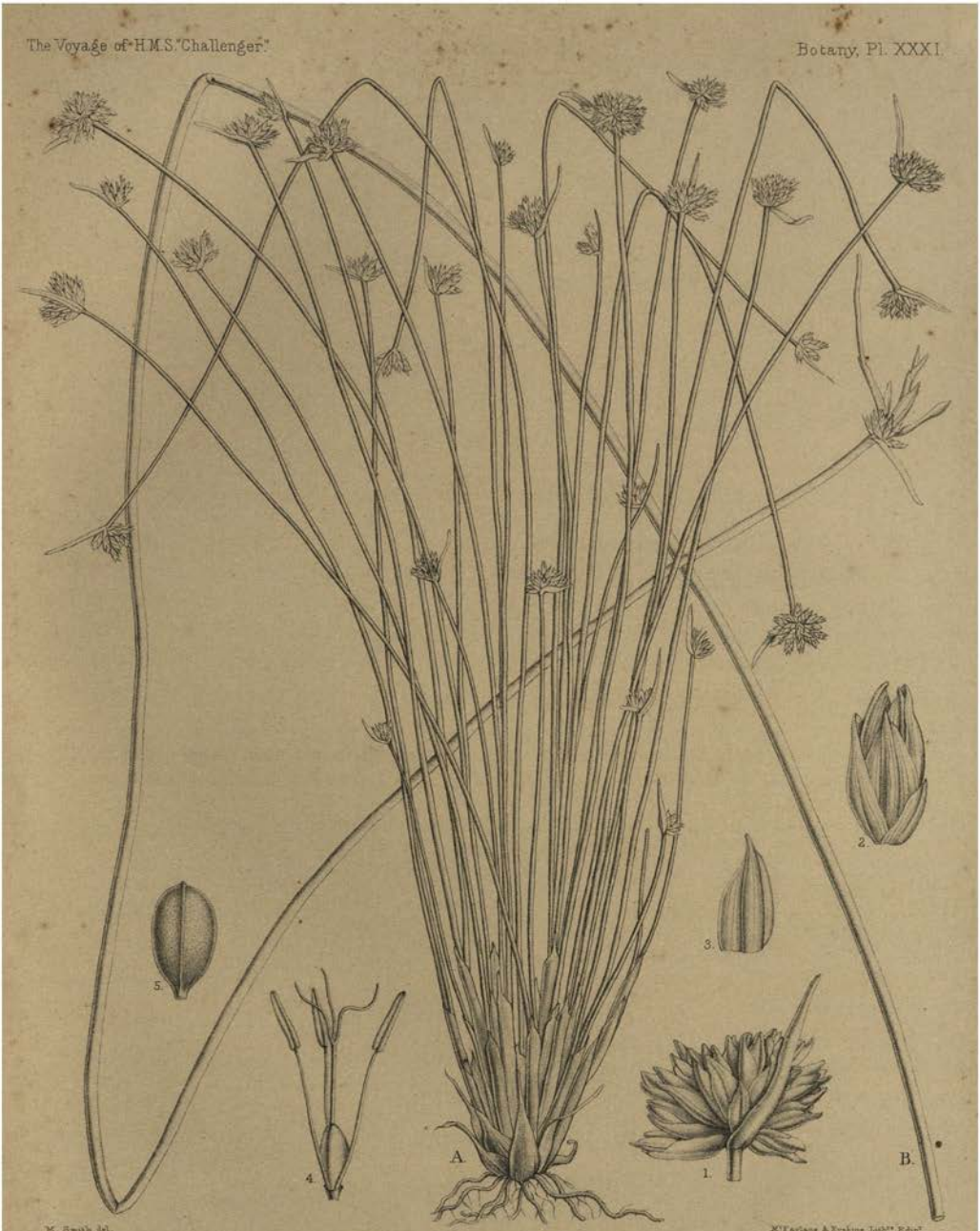
,, 2.—A single spikelet.

,, 3.—A glume.

,, 4.—A flower.

,, 5.—A nut: all enlarged.

The figure A, was drawn from a specimen in Kew Herbarium from Tristan da Cunha, collected by MacGillivray, and B, from a specimen collected in Inaccessible Island by Mr Moseley.



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SCIRPUS SULCATUS, *Thouars*

PLATE XXXII.

PLATE XXXII.

A plant of *Scirpus sulcatus*, var. *moseleyanus*, natural size.

Figure 1.—A leaf.

„ 2.—An inflorescence.

„ 3.—A cluster of three unequal spikelets.

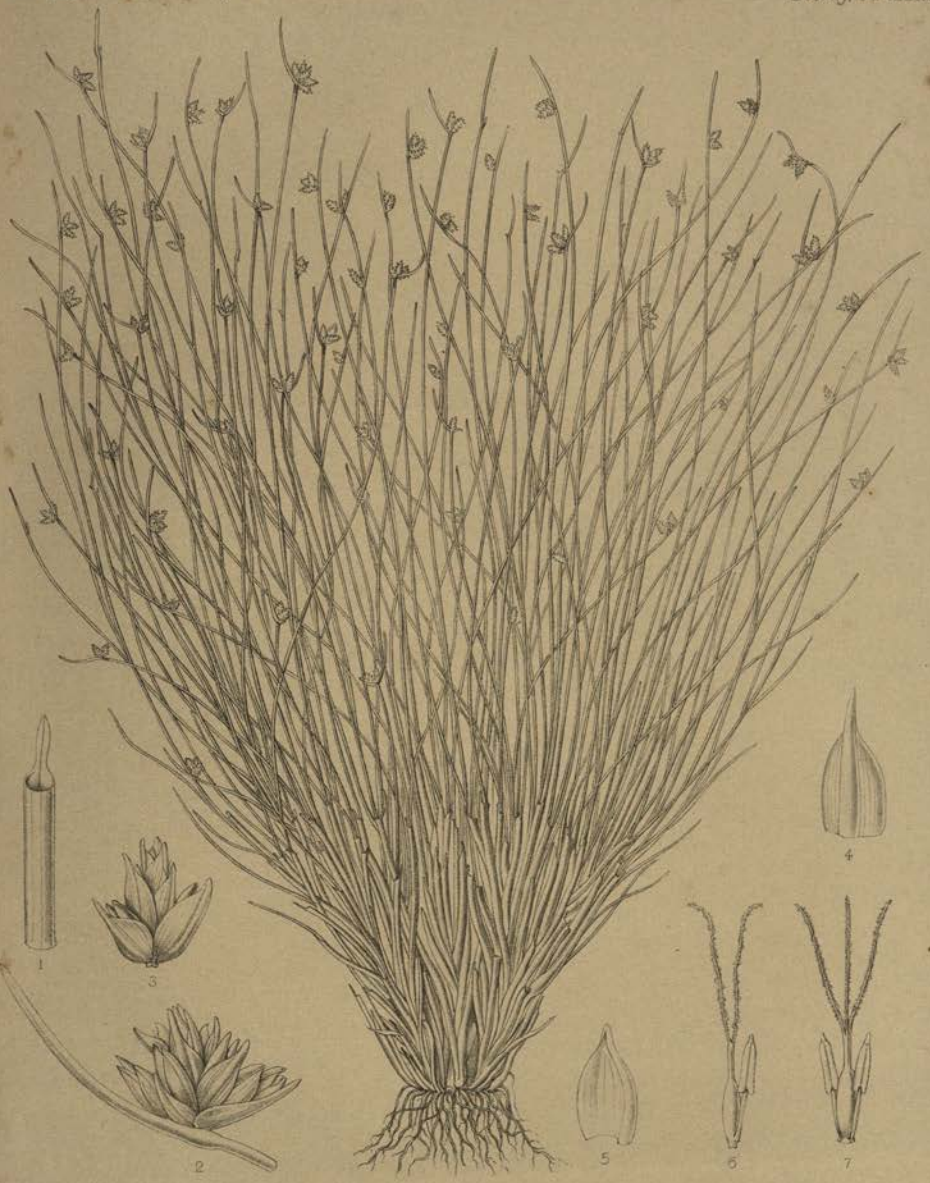
„ 4.—An outer glume.

„ 5.—A flowering glume.

„ 6.—A monandrous flower with a bifid style.

„ 7.—A diandrous flower with a trifid style: all very much enlarged.

Drawn from a specimen in Kew Herbarium, collected by Mr Moseley.



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SCIRPUS SULCATUS, *Thouars.* var MOSELEYANUS *Hemsl.*

PLATE XXXIII.

PLATE XXXIII.

Figs. A and 1–6. *Scirpus thouarsianus*, var. *pallescens*.

Figure A.—A plant, natural size.

,, 1.—A leaf.

,, 2.—A spikelet.

,, 3.—Lowermost glume of the spikelet, seen from the outside.

,, 4.—One of the flowering glumes seen from the inside.

,, 5.—A flower.

,, 6.—A nut of which the reticulation is somewhat exaggerated: all the figures enlarged, except where otherwise stated.

The drawing was made from a plant collected by Mr Moseley in Inaccessible Island.

Figs. 7–12. *Scirpus thouarsianus*, var. *virens*.

Figure 7.—A leaf.

,, 8.—One of the larger inflorescences.

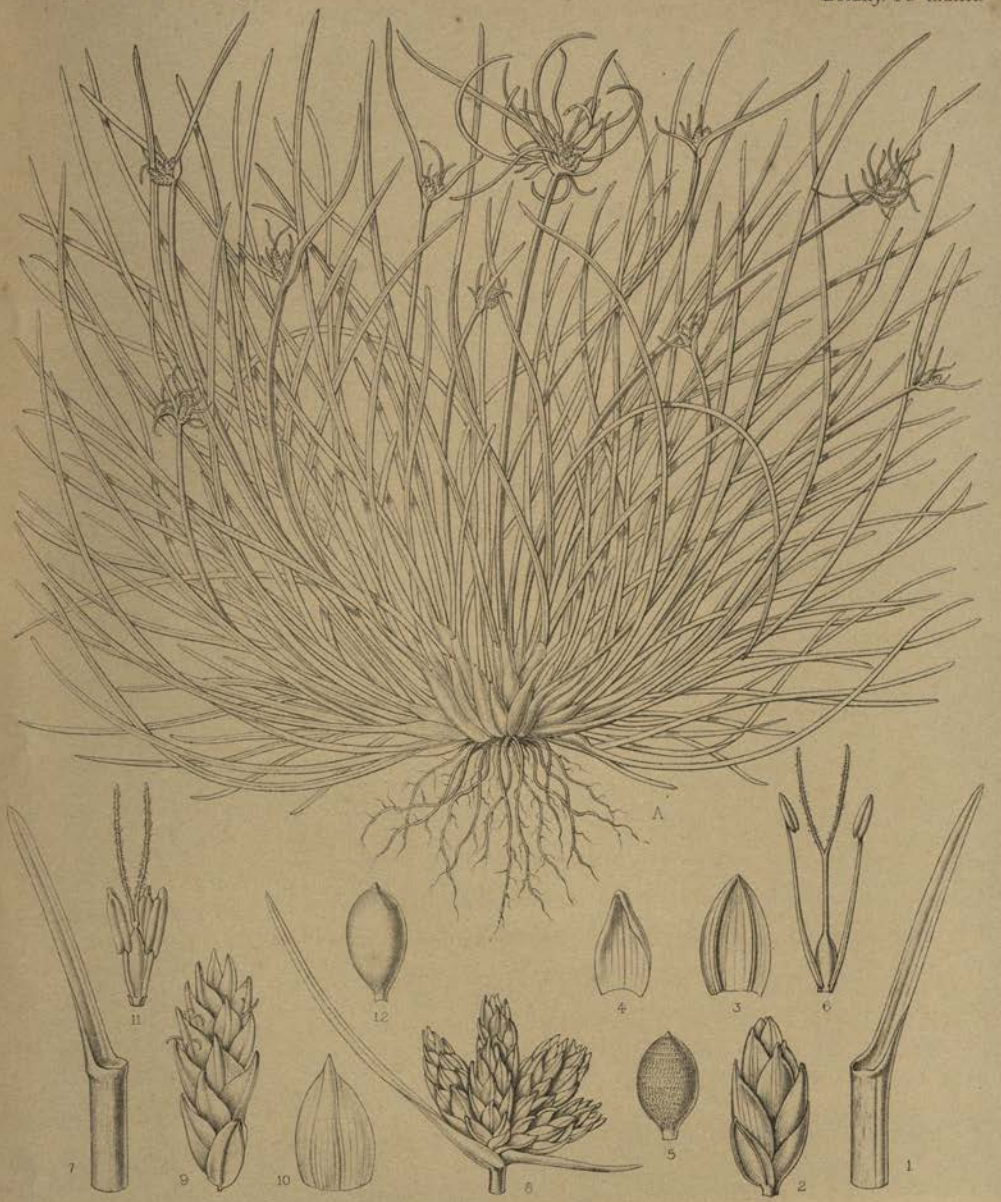
,, 9.—A spikelet of the same.

,, 10.—A flowering glume.

,, 11.—A flower in a very young state.

,, 12.—An immature nut: all very much enlarged.

Drawn from a plant collected by Mr Moseley in Nightingale Island.



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A. 1–6 SCIRPUS THOUARSIANAS, *Schultes*, var. PALLESCENS, *Hemsl.*
7–12. SCIRPUS THOUARSIANAS, *Schultes*, var. VIRENS, *Hemsl.*

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PLATE XXXIV.

PLATE XXXIV.

Figs. A and 1–7. *Scirpus oliveri.*

Figure A.—A plant, natural size.

,, 1.—A leaf with part of its sheath.

,, 2.—An inflorescence.

,, 3.—A single spikelet.

,, 4.—An outer glume.

,, 5.—A very young flower.

,, 6.—A pistil.

,, 7.—A young nut, the surface of which is represented too rough in the lithograph: all more or less enlarged.

Drawn from a specimen in Kew Herbarium, collected by Mr Moseley in Inaccessible Island.

Figs. B and 8–16. *Scirpus thouarsianus*, var. *bicolor.*

Figure B.—A plant, natural size.

,, 8.—A leaf.

,, 9.—A proliferous inflorescence.

,, 10.—A normal inflorescence.

,, 11.—Lowermost glume of a spikelet.

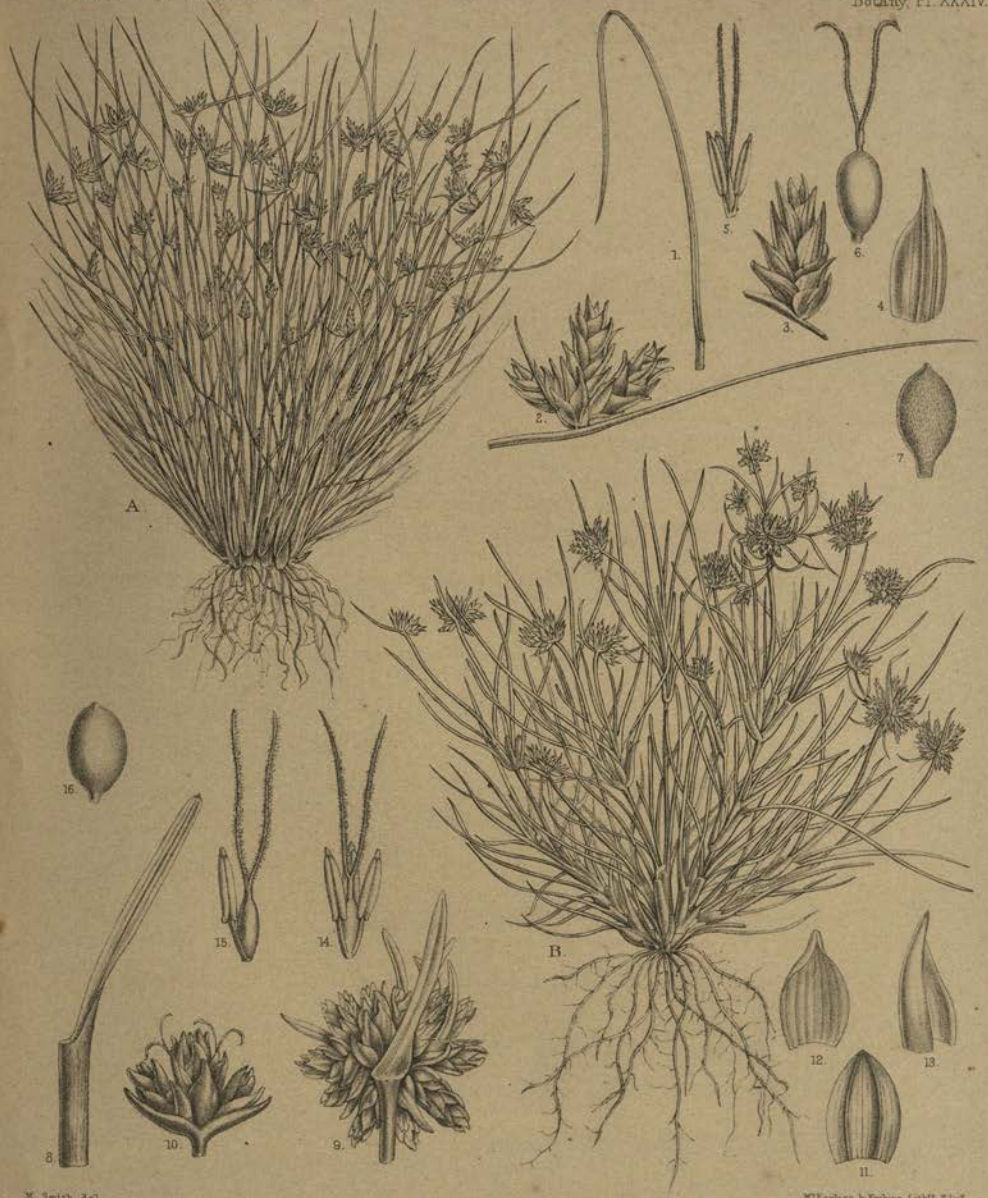
Figures 12 and 13.—A flowering glume in different positions.

Figure 14.—A triandrous flower.

,, 15.—A monandrous flower.

,, 16.—An immature nut: all enlarged.

The drawing represents a plant in Kew Herbarium, collected by Milne in Tristan da Cunha.



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A. 1-7. SCIRPUS OLIVERI, *Boeckeler*
B. 8-16. SCIRPUS THOUARSIANUS, *Schult.* var BICOLOR, *Hemsl.*

PLATE XXXV.

PLATE XXXV.

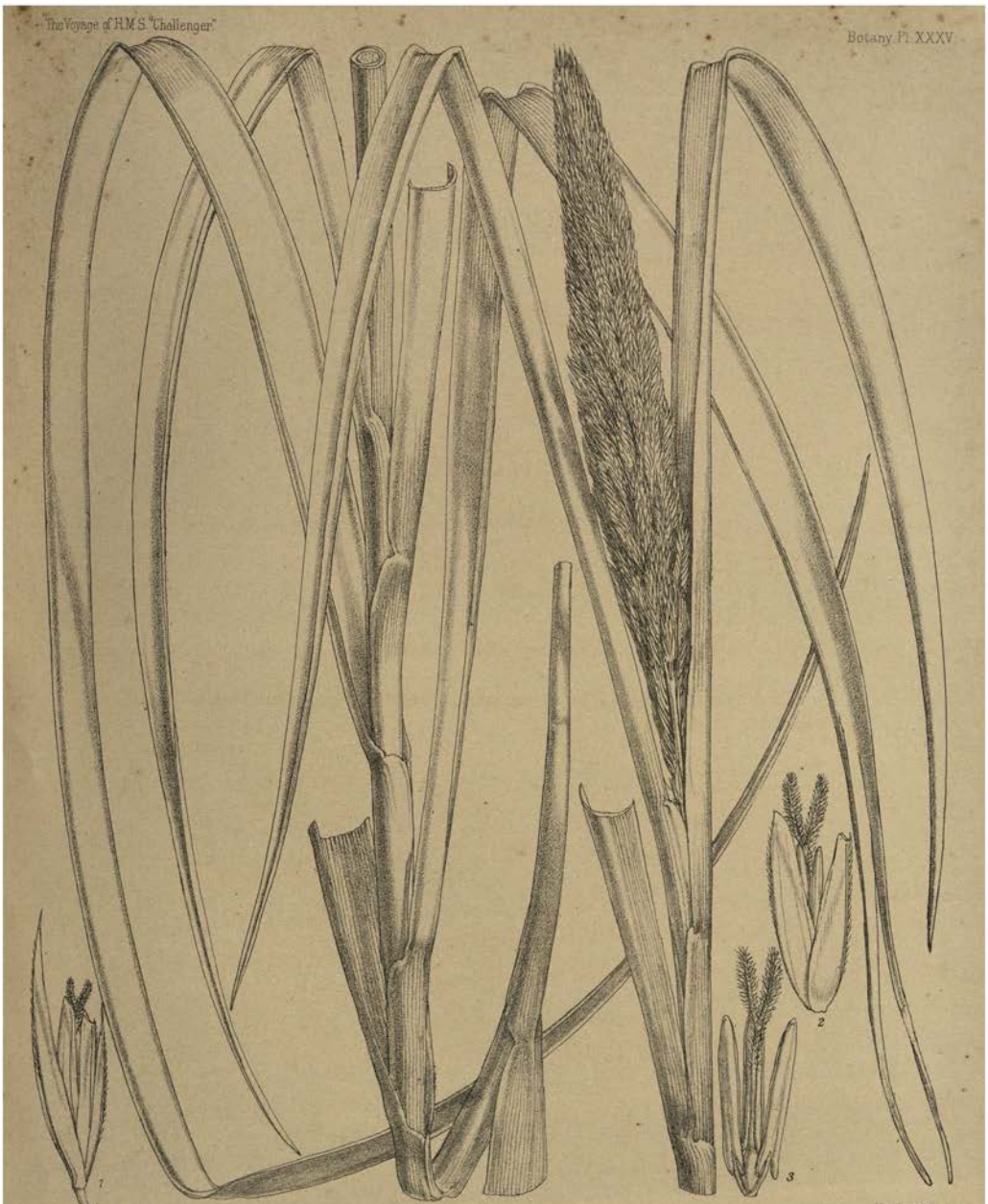
Portions of *Spartina arundinacea*, natural size.

Figure 1.—A spikelet.

,, 2.—A flower.

,, 3.—Stamens and pistil from a bud: all enlarged.

The drawing was made from a specimen in Kew Herbarium from Inaccessible Island, collected by Mr Moseley.



W.H.Fitch del et lith

Hanhart imp

SPARTINA ARUNDINACEA, *Carmich.*

PLATE XXXVI.

PLATE XXXVI.

Portion of a plant of *Agrostis ramulosa*, natural size.

Figure 1.—A leaf.

„ 2.—A panicle.

Figures 3 and 4.—The outer empty glumes.

Figure 5.—A flower.

„ 6.—Flowering glume.

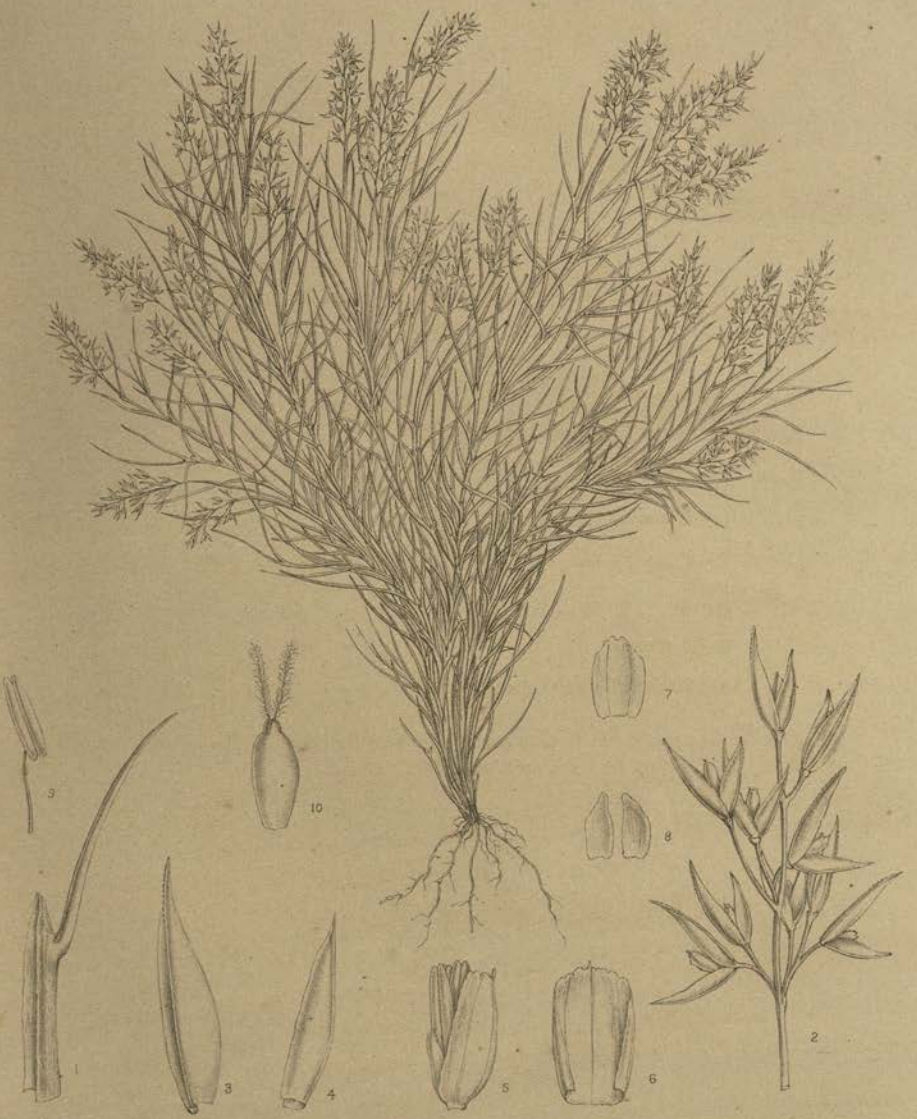
„ 7.—Pale.

„ 8.—Lodicules.

„ 9.—A stamen.

„ 10.—Pistil: all much enlarged.

The drawing was made from specimens in Kew Herbarium, collected in Tristan da Cunha by MacGillivray on the Voyage of H.M.S. "Herald."



M. Smith, del. W. Gibb, lith. G. Waterston & Sons, imp.

AGROSTIS RAMULOSA, *Carmich.*

PLATE XXXVII.

PLATE XXXVII.

A plant of *Agrostis media*, natural size.

Figure 1.—A leaf.

„ 2.—A panicle.

Figures 3 and 4.—The outer empty glumes.

Figure 5.—Flowering glume.

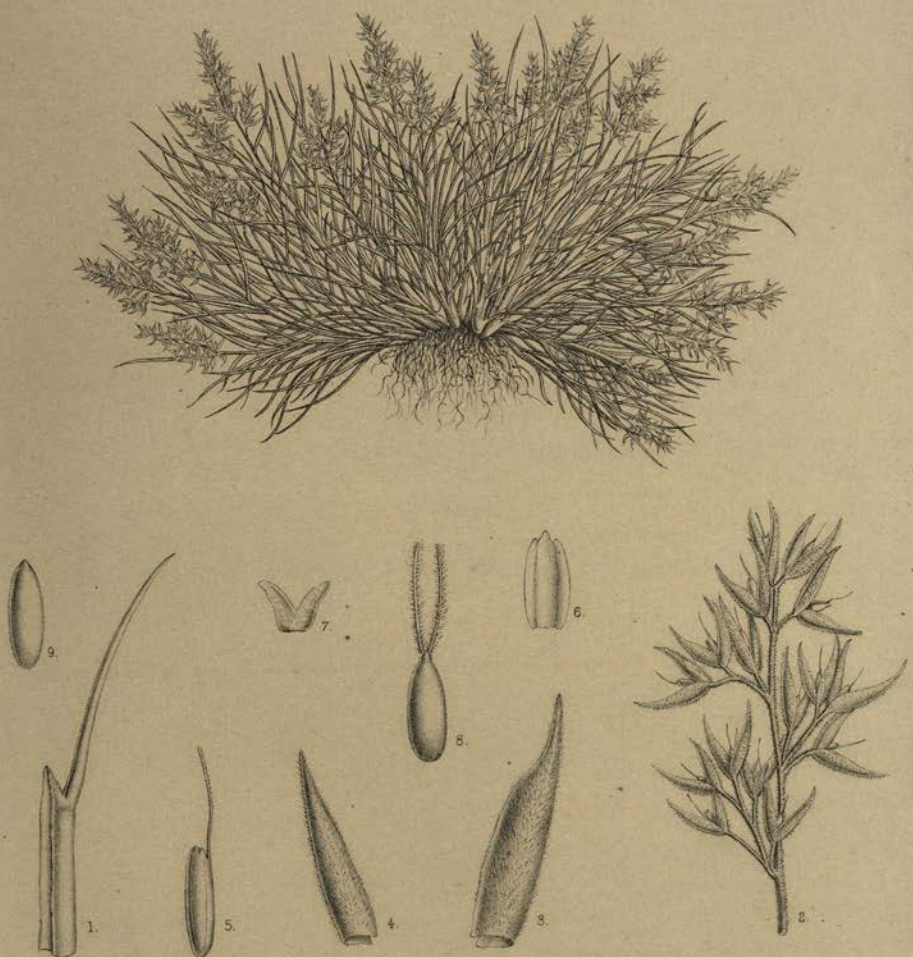
„ 6.—Pale.

„ 7.—Lodicules.

„ 8.—Pistil.

„ 9.—Young grain: all very much enlarged.

Drawn from a specimen in Kew Herbarium, collected in Tristan da Cunha by Mr Moseley.



M. Smith del.

Mc Farlane & Erskine, Lith. Edin.

AGROSTIS MEDIA, *Carmich.*

PLATE XXXVIII.

PLATE XXXVIII.

A plant of *Hymenophyllum æruginosum*, natural size.

Figures 1 and 2.—Portions of a frond very much enlarged.

Drawn from a specimen in Kew Herbarium, collected by Mr Moseley.

W.H.Fitch del. et lith.

HYMENOPHYLLUM ÆRUGINOSUM, *Carruth.*

Hanhart imp.

PLATE XXXIX.

PLATE XXXIX.

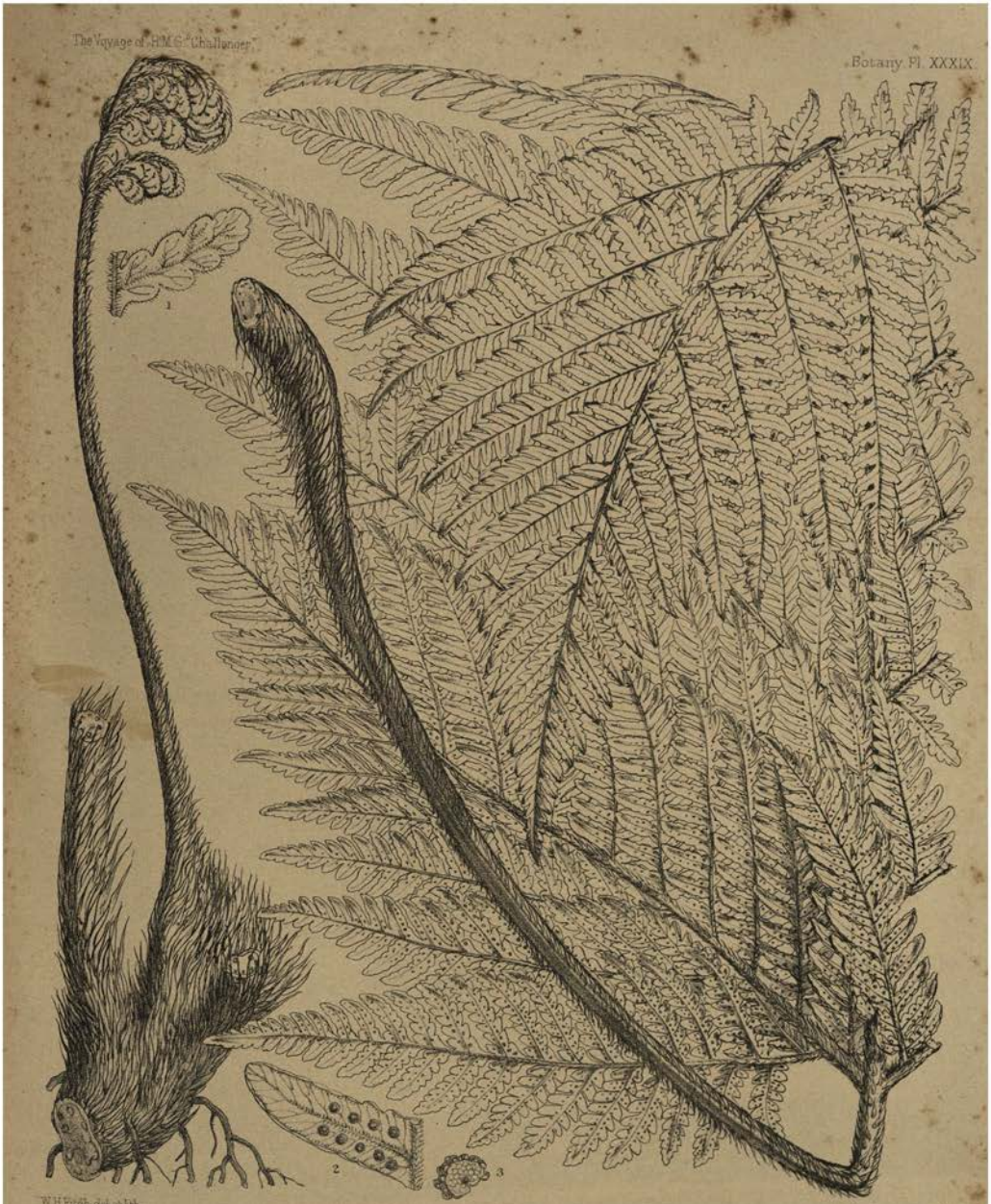
A rhizome and young frond, and the greater portion of a fully developed frond of *Nephrodium aquilinum*, natural size.

Figure 1.—An ultimate segment seen from above.

,, 2.—An ultimate segment seen from below.

,, 3.—A sorus: all enlarged.

The drawing of the rhizome and young frond is from a specimen in Kew Herbarium collected by Mr Moseley, and the fully developed frond from a specimen collected by Carmichael, and bearing his manuscript name of *Polypodium acunhianum*: both from Tristan da Cunha.



W.H.Fitch del et lith.

NEPHRODIUM AQUILINUM, *Hemsl.*

Hanhart imp.

PLATE XL.

PLATE XL.

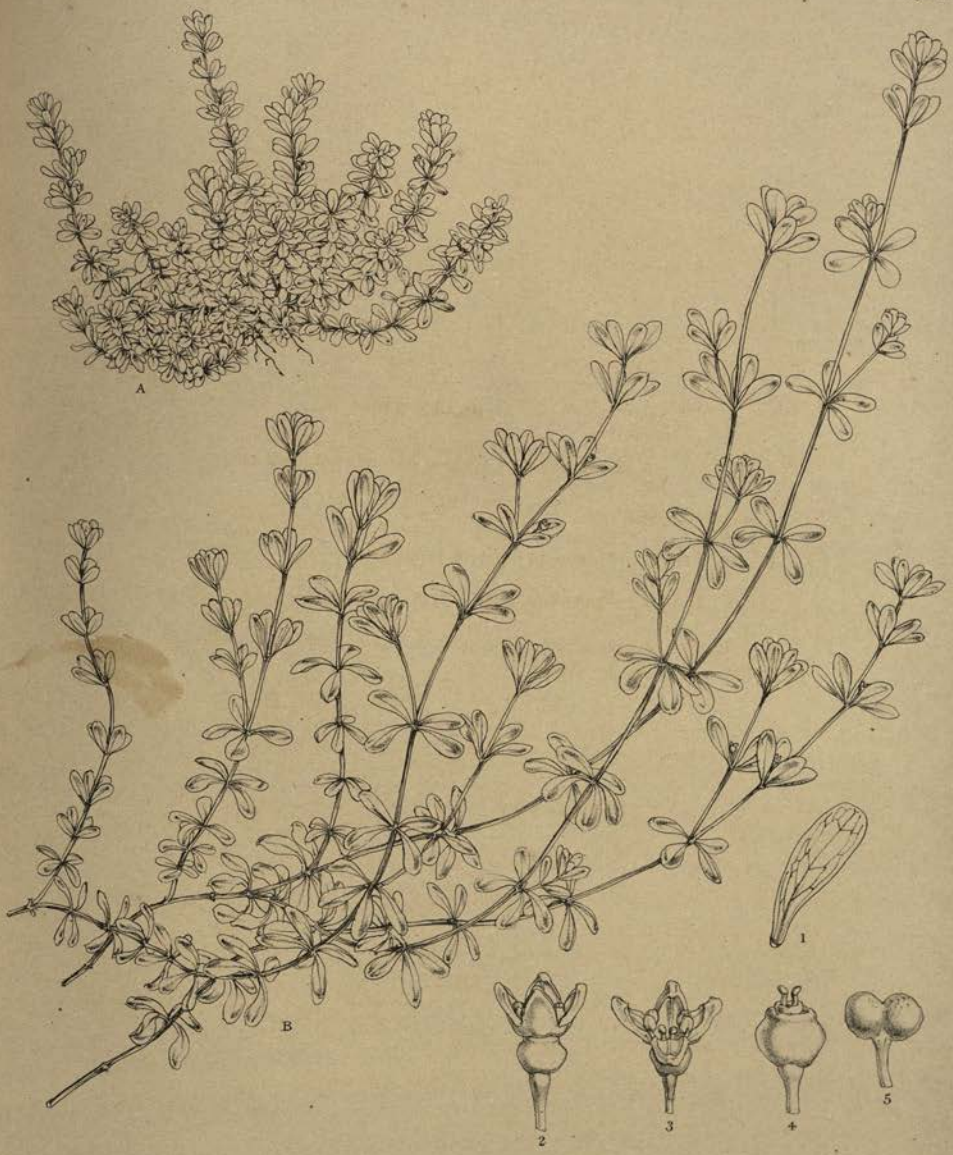
A and B, plants of *Galium antarcticum*, natural size.

Figure 1.—A leaf.

Figures 2 and 3.—Flowers in different positions.

,, 4 and 5.—Fruit in different stages: all enlarged.

The drawing was made from specimens in Kew Herbarium, collected by the Rev. A. E. Eaton in Kerguelen Island.



W.H.Fitch del et lith.

GALIUM ANTARCTICUM, *Hook.f.*

Hanhart imp.

PLATE XLI.

PLATE XLI.

A plant of *Plantago stauntoni*, having flowers in which the corolla-tube is longer than the lobes; natural size.

Figure 1.—A bract.

,, 2.—A flower.

,, 3.—A corolla laid open, showing the persistent filaments from which the anthers have fallen.

,, 4.—A pistil in an advanced stage.

,, 5.—A vertical section at a somewhat later stage, showing the attachment of two of the lateral seeds and the solitary apical one.

,, 6.—A ripe fruit in the persistent calyx subtended by a bract.

,, 7.—The operculum or upper part of the capsule, with the placenta protruding below.

,, 8.—The placenta, showing the points of attachment of two of the lateral seeds and the solitary apical one.

,, 9.—Ventral view of one of the lateral seeds.

,, 10.—Apical seed: all enlarged.

Drawing made from a plant in Kew Herbarium, collected by Mr De l'Isle in St Paul Island.

M. Smith, del. W. Gibb, lith. G. Waterston & Sons, imp.

PLANTAGO STAUNTONI. *Reichardt.*

PLATE XLII.

PLATE XLII.

Figs. A and 1–6. *Plantago stauntoni.*

Figure A.—A plant having flowers in which the corolla-tube is shorter (young ?) than the lobes, with included stamens; natural size.

„ 1.—An unopened flower with its bract.

„ 2.—A corolla.

„ 3.—The same laid open, showing the stamens.

„ 4.—Front view of an anther.

„ 5.—Back view of an anther.

„ 6.—A pistil: all enlarged.

Drawing made from a plant in the Kew Herbarium, collected by Lieut. Smith in St Paul Island.

Figs. B, C, and 7–15. *Plantago pentasperma.*

Figure B.—A plant having inconspicuous corollas (young ?), with the tube shorter than the lobes; natural size.

„ C.—A plant of the form having conspicuous corollas, with the tube longer than the lobes; natural size.

„ 7.—A flower of C.

„ 8.—A bract.

„ 9.—A corolla laid open, showing the insertion of the long filaments, from which the anthers have fallen away.

„ 10.—An immature capsule.

„ 11.—The upper opercular portion of the capsule which dehisces from the lower, carrying away the placenta and seeds, two of which may be seen protruding below.

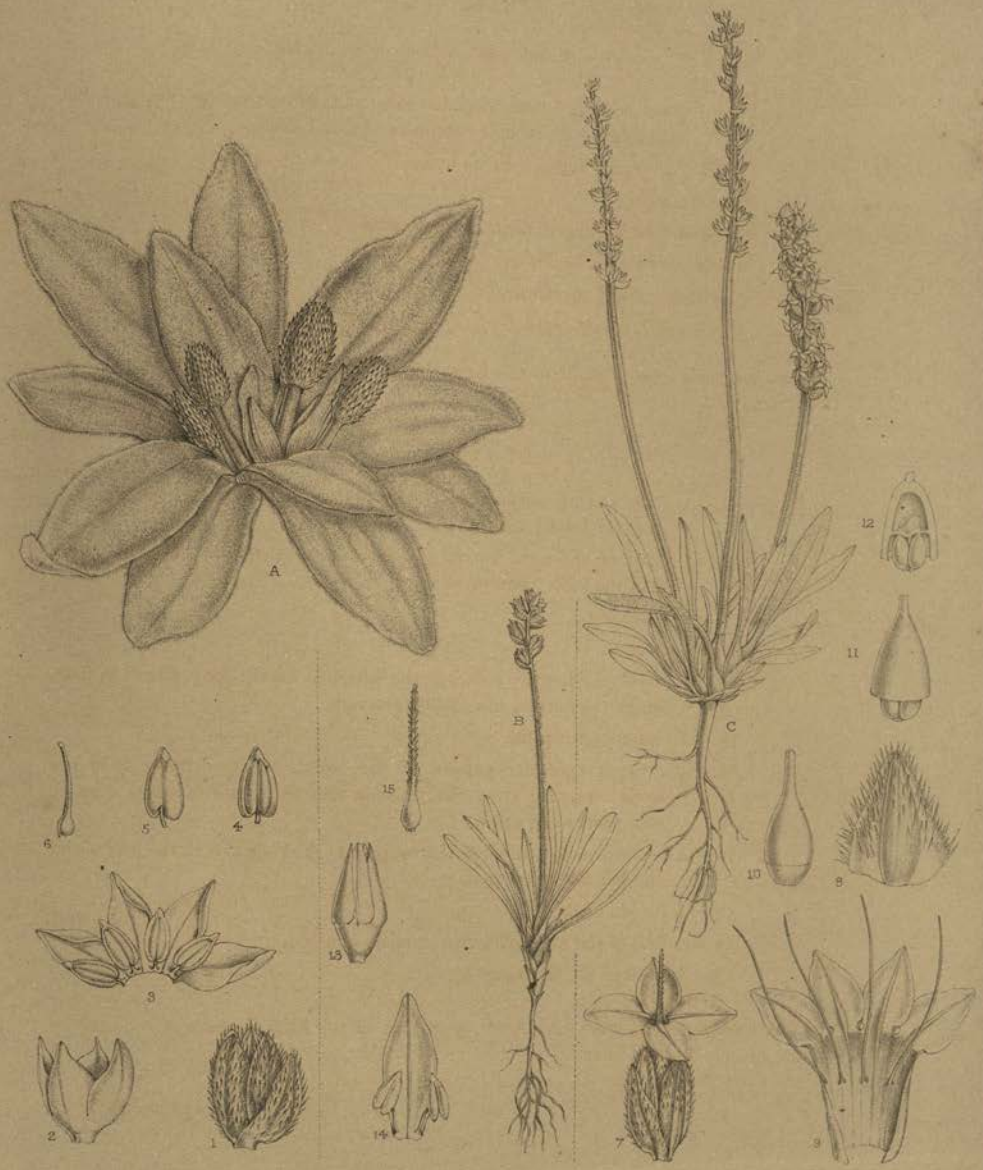
„ 12.—A vertical section through the operculum showing two of the lateral and the solitary apical seeds.

„ 13.—A corolla of B.

„ 14.—A lobe of the same with two stamens attached.

„ 15.—A pistil of B: all enlarged.

The drawings of B were made from specimens in the Kew Herbarium, collected by Mr De l'Isle in St Paul Island.



M. Smith. del. W. Gibb, lith.

G. Waterston & Sons, imp.

A. PLANTAGO STAUNTONI. *Reichardt.*
B. & C. PLANTAGO PENTASPERMA. *Hemsl.*

PLATE XLIII.

PLATE XLIII.

A plant of *Agrostis difficilis*, natural size.

Figure 1.—Portion of a leaf, with ligule.

,, 2.—Portion of an inflorescence.

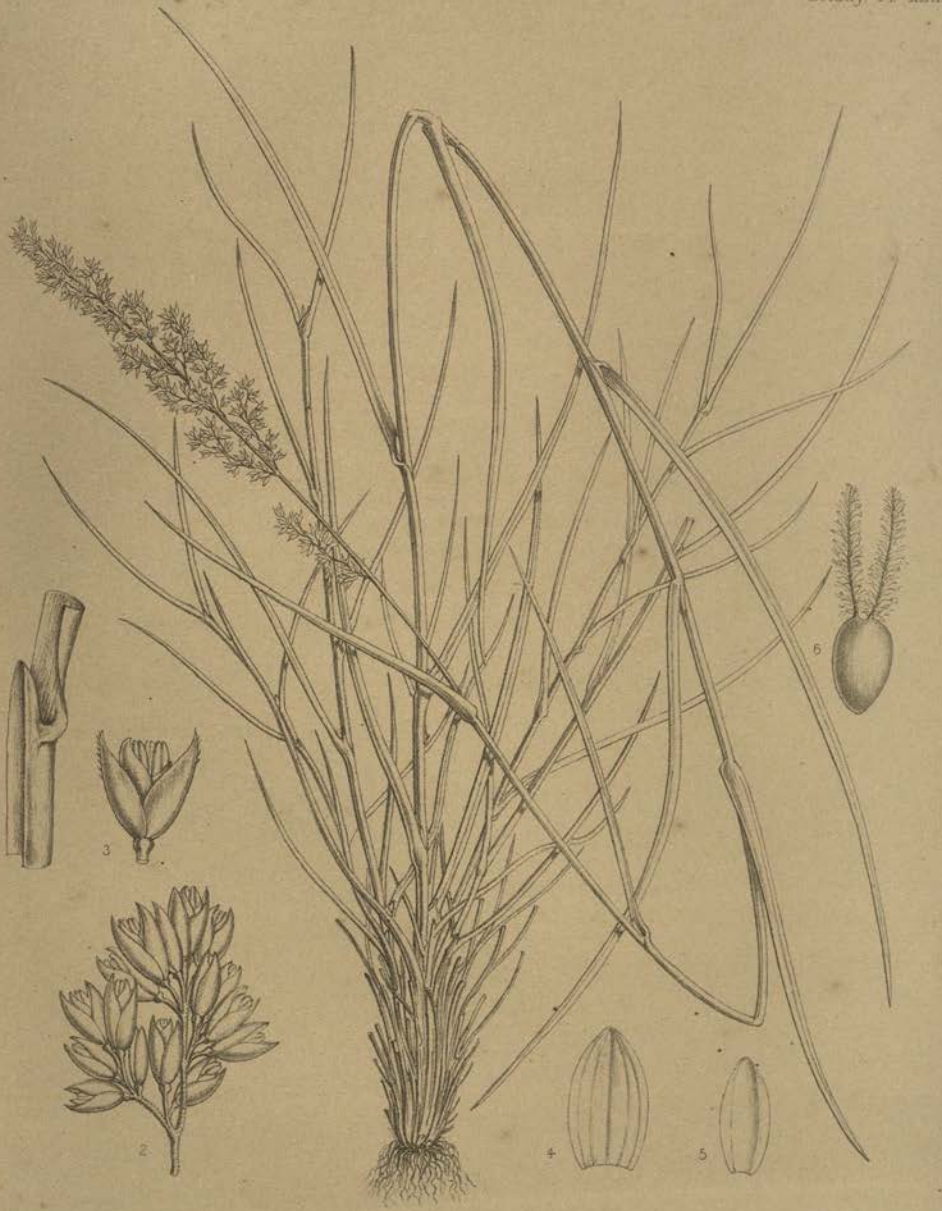
,, 3.—A floret.

,, 4.—Flowering glume.

,, 5.—Pale.

,, 6.—Pistil: all the figures enlarged.

Drawn from a specimen in the Kew Herbarium, collected in Amsterdam Island by Mr De l'Isle.



M. Smith, del. W. Gibb, lith.

G. Waterston & Sons, imp.

AGROSTIS DIFFICILIS. *Hemsl.*

PLATE XLIV.

PLATE XLIV.

A plant of *Agrostis delislei*, natural size.

Figure 1.—Portion of a leaf, with ligule.

„ 2.—Portion of an inflorescence.

Figures 3 and 4.—Outer empty glumes.

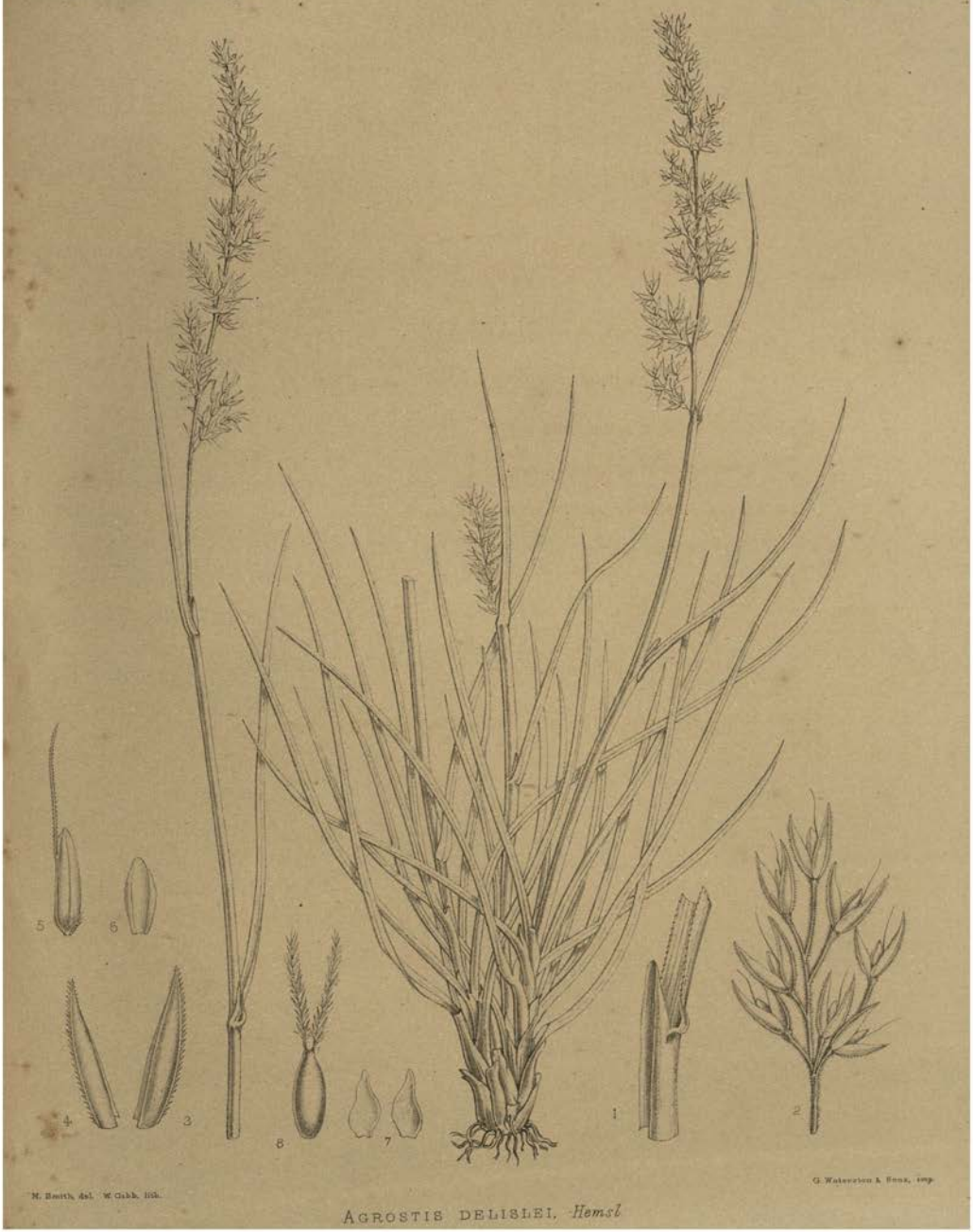
Figure 5.—Flowering glume.

„ 6.—Pale.

„ 7.—Lodicules.

„ 8.—Pistil : all the figures enlarged.

Drawn from a specimen in the Kew Herbarium, collected in Amsterdam Island by Mr De l'Isle.



M. Smith, del. W. Gibb, lith.
G. Waterston & Sons, imp.

AGROSTIS DELISLEI. *Hemsl*

PLATE XLV.

PLATE XLV.

A plant, or rather portion of a plant, of *Uncinia brevicaulis*, var. *robustior*, natural size.

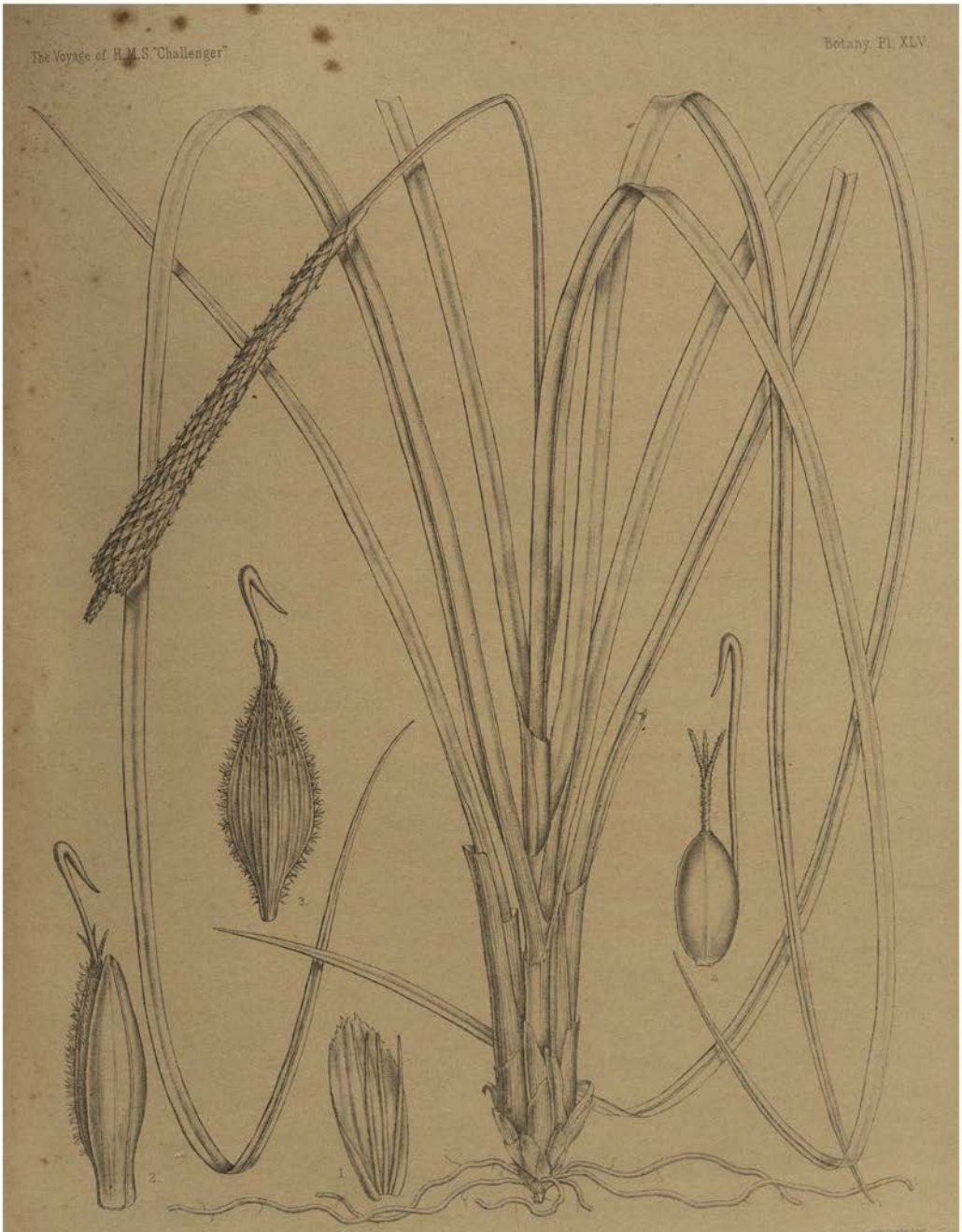
Figure 1.—Glume and stamens from which the anthers have fallen.

,, 2.—A female flower and glume.

,, 3.—The same with the glume removed.

,, 4.—Pistil and rhachilla: all enlarged.

The drawing represents a specimen collected by De l'Isle in Amsterdam Island. The tip of the spike is male only, and the whole plant is more robust, otherwise it differs very little from the form which we call *graçilior*.



UNCINIA BREVICAULIS, *Thouars.* var. ROBUSTIOR, *Hemsl.*

PLATE XLVI.

PLATE XLVI.

A plant of *Uncinia brevicaulis*, var. *gracilior*, natural size.

Figure 1.—A male flower with its glume.

„ 2.—A female flower with its glume.

„ 3.—The same without the glume.

„ 4.—The same with the rhachilla and the lower part of the utricle: all enlarged.

The plant figured was collected in Tristan da Cunha by MacGillivray and Milne, and is preserved in Kew Herbarium.

M. Smith del.

UNCINIA BREVICAULIS, *Thouars*, var GRACILIOR, *Hemsl.*

PLATE XLVII.

PLATE XLVII.

A branch of *Pisonia darwinii*, natural size.

Figure 1.—A flower in bud.

„ 2.—An expanded perianth after the stamens have fallen away.

„ 3.—The same laid open.

„ 4.—A flower from which the perianth has been removed.

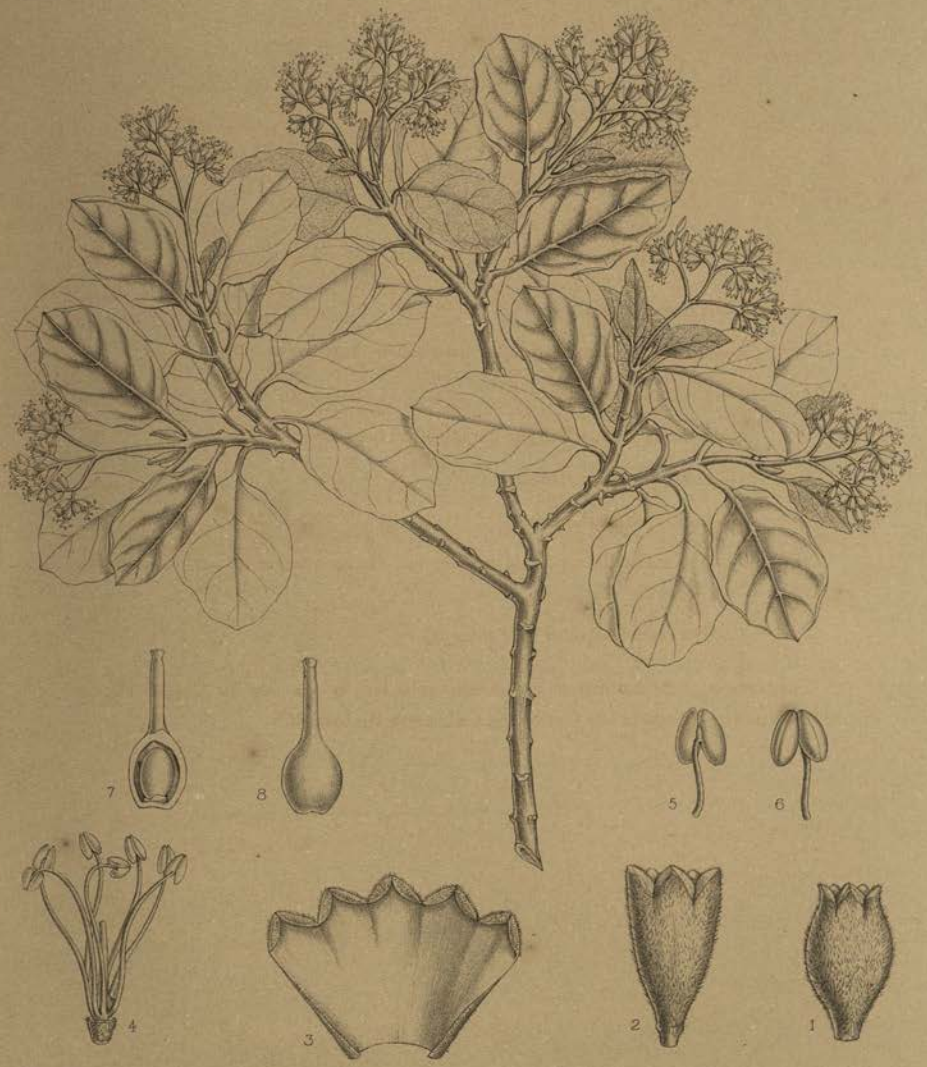
„ 5.—Front view of a stamen.

„ 6.—Back view of the same.

„ 7.—A pistil with a portion of the wall of the ovary removed, revealing the ovule.

„ 8.—The same unopened; all enlarged.

The drawing was made from a specimen collected by the late Mr Charles Darwin, which is now preserved in the Cambridge University Herbarium.



M. Smith del. W. Gibb, lith.

G. Waterston & Sons, imp.

PISONIA DARWINII, *Hemsl.*

PLATE XLVIII.

PLATE XLVIII.

Figs. A, B, and 1–4. *Sium helenianum.*

Figure A.—Upper portion of a plant (the specimen Melliss regarded as different from both *Sium helenianum* and *Sium burchellii*), natural size.

„ B.—A leaf sent with the same, natural size.

„ 1.—A petal from a flower taken from A.

„ 2.—Quite young fruit of the same: both very much enlarged.

„ 3.—A ripe fruit of *Sium helenianum* from the same source (detached from plant, and communicated by Melliss in 1867 as "*Angelica bracteata*") as that figured in Hooker's Icones Plantarum, t. 1032.

„ 4.—A cross section of the same: very much enlarged.

Figs. C and 5–7. *Sium burchellii.*

Figure C.—Upper part of a plant, and apparently the very same piece represented somewhat abbreviated in Hooker's Icones Plantarum, t. 1033; natural size.

„ 5.—A petal from the same specimen.

„ 6.—A young fruit (intermediate in its degree of development between figs. 2 and 3).

„ 7.—A cross section of the same: enlarged.

N. Smith del.

M'Farlane & Erskine, Lith^rs Edin^r

A B 1-4 SIUM HELENIANUM, *Hook f.*
C 5-7 SIUM BURCHELLII, *Hemsl.*

PLATE XLIX.

PLATE XLIX.

A flowering branch of *Acalypha rubra*, natural size.

Figure 1.—A piece of a male spike.

„ 2.—A male flower.

„ 3.—A stamen.

„ 4.—A female flower.

„ 5.—A mature capsule, seated in its enveloping bract, and lower portion of the male inflorescence.

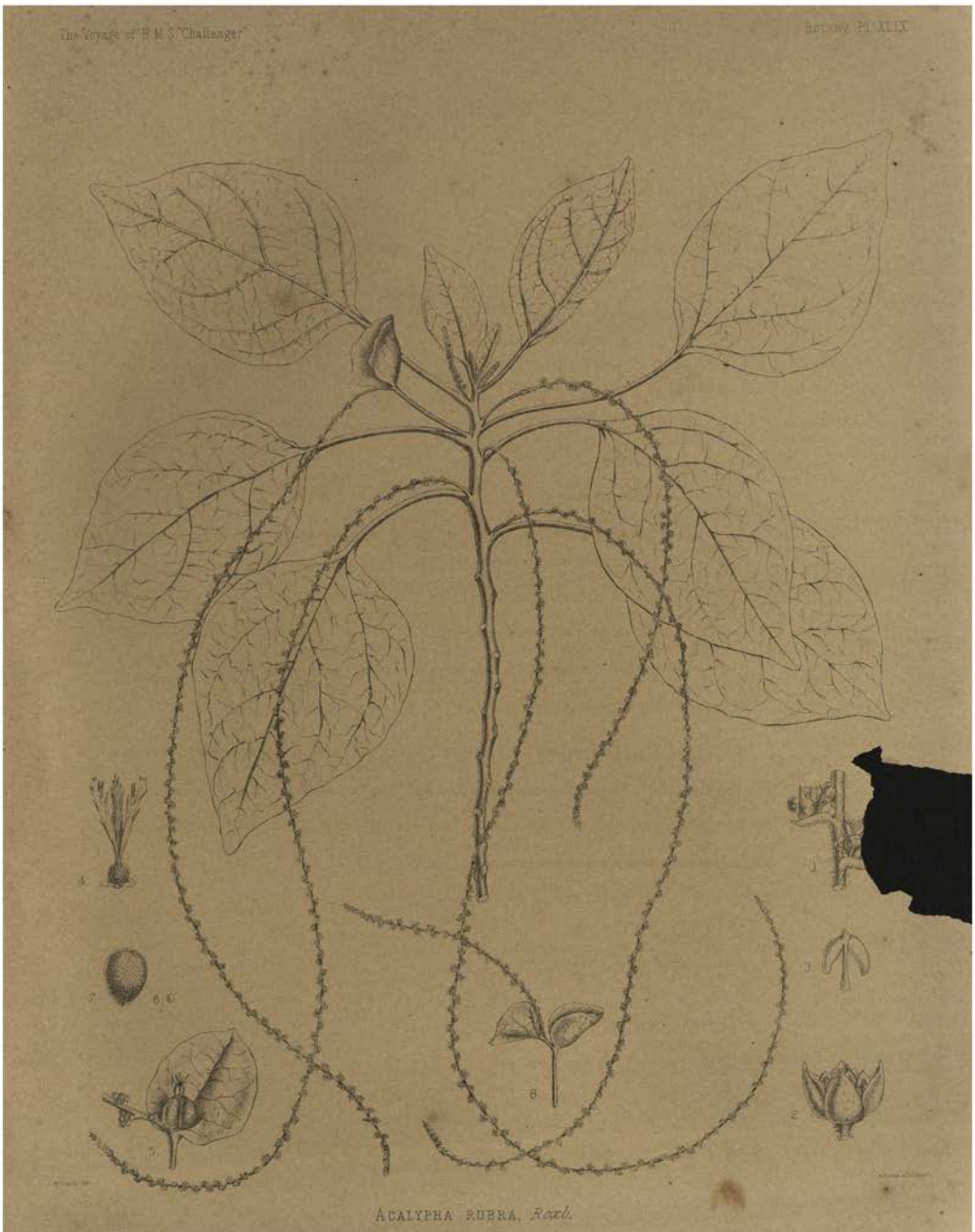
„ 6.—A seed, natural size.

„ 7.—The same, very much enlarged.

„ 8.—An inflorescence with two female flowers, natural size.

Figures 1 to 5 all more or less enlarged.

The principal figure represents a specimen in Kew Herbarium collected by Mr Bennett, and the male inflorescence, flower, and anther are from the same. Figures 4 to 7 are from Dr Burchell's specimen; and figure 8 is from the specimen in the Sabine collection, on which there are four similar inflorescences.



ACALYPHA RUBRA, *Forst.*

PLATE L.

PLATE L.

A small tuft of *Eragrostis saxatilis*, natural size.

Figure 1.—Portion of the blade and sheath of a leaf with the fringed ligule.

„ 2.—A spikelet.

Figures 3 and 4.—The outer empty glumes.

Figure 5.—A flowering glume.

„ 6.—A pale, front view.

„ 7.—A very young flower.

„ 8.—Pistil: all very much enlarged.

Drawing made from a plant in Kew Herbarium, collected by Mr Melliss.

M. Smith, del. W. Ogle, lith.

G. Waterston & Sons, imp.

ERAGROSTIS SAXATILIS. *Hemsl.*

PLATE LI.

PLATE LI.

Figs. A and 1–8. *Demazeria oblitera.*

Figure A.—A plant, natural size.

„ 1.—The blade and portion of the sheath of a leaf.

„ 2.—A spikelet.

Figures 3 and 4.—The two lower empty glumes.

Figure 5.—Flowering glume seen from the side.

„ 6.—Pale.

„ 7.—Pistil.

„ 8.—Caryopsis.

The drawing was made from a plant in Kew Herbarium, collected by Dr Burchell, and the only one known to exist.

Figs. 9–12. *Demazeria acutiflora.*

Figure 9.—A spikelet.

Figures 10 and 11.—The two lower empty glumes of the same.

Figure 12.—Flowering glume, with bearded keel: all enlarged.

M. Smith del. McFarlane & Erskine, Lith^rs Edin^r

A. 1–8 DEMAZERIA OBLITERA, *Hemsl*
9–12 DEMAZERIA ACUTIFLORA, *Hemsl*

PLATE LII.

PLATE LII.

A plant of *Trisetum insulare*, natural size.

Figure 1.—Part of a leaf, showing the ciliolate ligule.

„ 2.—Part of an inflorescence.

Figures 3 and 4.—The outer empty glumes.

„ 5 and 6.—Flowering glume, the latter much more enlarged.

Figure 7.—Pale.

„ 8.—A very young flower.

„ 9.—Ripe caryopsis: all the figures very much enlarged.

The drawing was made from a plant in Kew Herbarium, collected by Mr MacGillivray in St Paul Island.

TRISETUM INSULARE, *Hemsl.*

PLATE LIII.

PLATE LIII.

Distichophyllum fasciculatum.

Figure 1.—Portion of a plant.

„ 2.—Leaf arrangement.

„ 3.—A leaf, and enlarged cells.

„ 4.—Base of peduncle and perichætium : all except figure 1 enlarged.

Distichophyllum imbricatum.

Figure 1.—Portion of a plant, natural size.

Figures 2 and 3.—Leaves, and enlarged cells.

Grimmia (Schistidium) insularis.

Figure 1.—Portion of a plant.

„ 2.—A leaf with section, and enlarged cells.

„ 3.—Perichætium and capsule.

„ 4.—Ripe capsule, operculum removed : all enlarged except figure 1.

Gottschea carnosa.

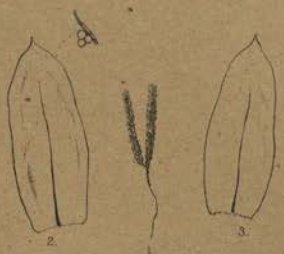
Figure 1.—Portion of plant.

„ 2.—Stem and leaves.

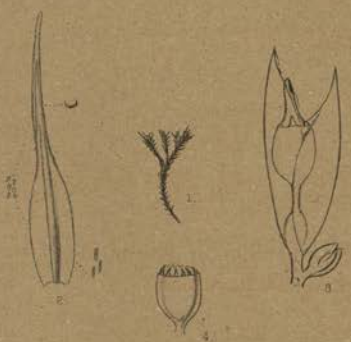
„ 3.—Stem with leaves removed : all except figure 1 enlarged.

Drawn from specimens in the Kew Herbarium collected by Mr Moseley. The first two and the last are from Marion Island, and the third from Heard Island.

DISTICHOPHYLLUM FASCICULATUM, *Mitt*



DISTICHOPHYLLUM IMBRICATUM, *Mitt.*



GRIMMIA INSULARIS, *Mitt.*

GOTTSCHIA CARNOSA, *Mitt.*

THE

VOYAGE OF H.M.S. CHALLENGER.

BOTANY.

REPORT on the BOTANY OF JUAN FERNANDEZ, the SOUTH-EASTERN MOLUCCAS, and the ADMIRALTY ISLANDS. By W. BOTTING HEMSLEY, A.L.S.

JUAN FERNANDEZ AND MASAFUERA.

INTRODUCTORY NOTES.

ORIGINALLY the name Juan Fernandez was applied to a group of three islands, of which the two principal were called Masatierra and Masafuera, indicating their positions with regard to the mainland. Now, that of Juan Fernandez is ordinarily applied to Masatierra only. This island, which is much the larger of the two, lies in about 33° 45′ S. latitude and 80° W. longitude, or about 400 miles from the coast of Chili. The area is about twenty square miles;[1] and the greatest altitude is 3000 feet. A few miles to the south is a small island called Santa Clara or Goat Island. Masafuera is about ninety miles westward of Juan Fernandez; it is a barren rock of lava and scoria, concerning which, however, we have found no details, though some twenty species of vascular plants have been collected there by different travellers.[2] The coast is precipitous, and landing on any part perilous and difficult. Within historical times Juan Fernandez has suffered from violent earthquakes, which have desolated the settlements. Lord Anson visited it in 1741, and his description of its products is the earliest of note, yet it contains little precise information on its natural history.

[1] For further particulars on the physical composition, climate, &c., see Mr Moseley's notes below (pp. 8, *et seqq.*), and Narrative of the Cruise of H.M.S. Challenger, Chap. xix.

[2] The island is described as being covered with trees by the Rev. Mr Walter in his narrative of Commodore Anson's stay at Juan Fernandez, as quoted in Crusoniana, p. 97. See p. 25, *postea*.

Botanical History of Juan Fernandez and Masafuera.

The botanical history of these islands dates back only a little more than half a century; for the accounts of the vegetation given in the writings of earlier travellers contain little definite information, and the first descriptions of the peculiar plants have all been published since 1830. Disregarding a few odd specimens collected by various persons who have merely touched at the island, the Juan Fernandez plants in the Kew Herbarium have been collected by about ten persons. Taking these collections in their chronological order, they are—Mrs M. Graham, 1823; David Douglas, with whom was Dr Scouler, 1824; Bertero, with whom was Cuming for a short time, 1830; Gay, 1832; Germain, 1854; Reed, about 1870; and Moseley, 1875. There is also a small collection in the Kew Herbarium, communicated in 1861 by Dr Philippi, without any collector's name; whether he himself visited the island is not evident from his writings.

Lasègue[1] has little to add to the foregoing list of collectors in Juan Fernandez. He casually mentions Caldcleugh, who was attached to the British Embassy in Brazil, as having botanised in the island with Bertero. Whether he made an independent collection we have not ascertained.

A few words respecting each of the above named collectors and collections, with references to, and extracts from what has been published thereon may follow here.

Mrs M. Graham, wife of Admiral Graham, who was some time on the Pacific station, paid more attention to ferns than flowering plants, though among the latter was a specimen of a *Wahlenbergia* (*Wahlenbergia grahamæ*, Hemsl.), which was rediscovered by Mr Moseley, and is published in this Report for the first time. This lady, who was no mean artist herself, as a picture painted by her of the Bay of Rio Janeiro, now in the possession of Sir Joseph Hooker, testifies, afterwards married Sir Augustus Callcott, the well-known painter, and *Escallonia callcottia* was named after her. In her Journal of a Residence in Chili, she gives a charming description of the Island of Juan Fernandez:—

"It is," she says, "the most picturesque place I ever saw, being composed of high perpendicular rocks, wooded nearly to the top, with beautiful valleys; and the ruins of the little town in the largest of these heighten the effect. . . . The valleys are exceedingly fertile, and watered by copious streams, which occasionally form small marshes, where the Panke [*Gunnera*] grows very luxuriantly, as well as watercresses and other aquatic plants. The little valley where the town is, or rather was, is full of fruit trees, and flowers and sweet herbs now grown wild; and near the shore it is covered with radishes and seaside oats. After dinner I walked to the valley called Lord Anson's Park, and on the way found numbers of European shrubs and herbs, and in the half-ruined hedges which denote the boundaries of former fields, we found apple, pear, and quince trees, and cherries almost ripe. The ascent is steep and rapid from the beach, even in the valleys, and the long grass was dry and slippery,

[1] Musée Botanique de Monsieur Benjamin Delessert, p. 259, &c. See also Hooker's Botanical Miscellany, ii. p. 303.

so that it rendered the walk rather fatiguing, and we were glad to sit down under a large quince-tree, on a carpet of balm bordered with roses, now neglected, and rest, and feast our eyes with the lovely view before us. Lord Anson has not exaggerated the beauty of the place, or the delights of the climate. We were rather early for its fruits; but even at this time we have gathered delicious figs, and cherries, and pears, that a few more days' sun would have perfected."

Mr David Douglas, whose numerous discoveries in Western North America are known to botanists and horticulturists alike, and who met with an untimely and horrible death[1] in the Sandwich Islands some ten years later, landed on Juan Fernandez on his first outward voyage in 1824. He was accompanied by Dr Scouler,[2] who was more specially devoted to zoological pursuits, though he made a small collection of dried plants. Their stay was very short, but Douglas[3] estimated that he collected seventy "distinct and highly interesting plants." Like Mrs Graham, he observed the colonised fruit trees, and he also mentions the Chilian strawberry, which was, and is still, very abundant; but his brief account of the vegetation contains nothing of special interest.[4] Many of his plants, as well as Bertero's, were described and published by the late Sir William Jackson Hooker and Dr G. A. Walker Arnott.[5]

The next in order is Bertero, who almost exhausted the botany of the island, and who, although he did not live to publish his plants, thoroughly studied and carefully labelled them—not one set alone but several, so that there is little difficulty in identifying them from the descriptions where the notes on Bertero's labels have been added. Dr Charles Joseph Bertero was born at Turin,[6] and was a member of the Academy of that town. In 1827 he left Europe intent upon the botanical exploration of Chili, towards which little had previously been done; and by the end of 1829 he had collected a herbarium of some 15,000 well preserved specimens. As the country was then being desolated by a civil war, he determined to leave the mainland and botanise Juan Fernandez and some other islands of the Pacific. He successfully accomplished that portion of his task relating to Juan Fernandez, where he collected about 2000 specimens, comprising, inclusive of cellular cryptogams, 300 species. This was done during the first half of the year 1830, and on his return to Valparaiso the plants were soon despatched to Europe, one set to Sir William Hooker, one to Mr Delessert, one to Turin, and others to various botanical establishments. Where the first or most complete set is we do not know, but the one acquired by Sir William Hooker, now in the general Herbarium at Kew, is nearly if not quite complete,

[1] He was found in a pit made to entrap cattle, gored to death by a bullock.

[2] Afterwards Lecturer on Natural History, and Keeper of the Royal Dublin Society's Museum.

[3] Hooker's Companion to the Botanical Magazine, ii. p. 86.

[4] Hooker's Companion to the Botanical Magazine, ii. pp. 84–86.

[5] Contributions towards a Flora of South America and the Islands of the Pacific: Hooker's Botanical Miscellany, iii. 1833, pp. 129–211, 302–367; Hooker's Journal of Botany, i. 1834, pp. 276–296, iii. pp. 19–47, 310–348; Hooker's Companion to the Botanical Magazine, i. 1835, pp. 29–38, 102–111, 234–244, ii. pp. 41–52, 250–254.

[6] Lasègue, Musée Botanique, p. 260.

judging from what has been published by Continental botanists. He also wrote[1] a sketch of the flora, the substance of which is reproduced below.

After arranging and sending off his plants to Europe, Bertero embraced the opportunity offered by a vessel sailing for Tahiti, to go to investigate the vegetation of that island, and, after making valuable collections, he took a passage to return to Valparaiso in a new Tahitian schooner, which was never heard of again after leaving port.[2] A sad fate, indeed, but far preferable to the shocking end of poor Douglas, who was the only botanist that anticipated Bertero in the discovery of the arboreous genera of Juan Fernandez Compositæ. Yet Bertero was the first to make them known to the world; and two of the genera and most of the species were first published from his specimens. The third genus, *Dendroseris*, was founded upon a specimen of one species collected in Masafuera by Cuming. The arboreous Compositæ which constitute the most peculiar element in the native vegetation were published, partly by Decaisne,[3] and partly by De Candolle; and Colla[4] published descriptions and rude figures of a large number of Bertero's Chilian and Juan Fernandez plants. Fortunately, he cites in full the inscriptions on Bertero's labels, thus greatly facilitating the identification of many of them.

Here follows the substance of Bertero's sketch of the vegetation, in which are intercalated the names of the plants adopted in this work.

The country was very well wooded, but the species of trees were few in number. The Canelo (*Drimys chilensis*) [*Drimys confertifolia*], the Mayu (*Zanthoxylum mayu*), and the Luma or Temu (*Myrtus?*) [*Myrtus fernandeziana*] were the commonest; some of the trees were of a prodigious size. Sandalwood was only found in a dead condition, and usually half-buried in the earth. Proficients state, he says, that it is of better quality than that of the Sandwich Islands.

Although in the same latitude as Valparaiso, Juan Fernandez possesses a markedly different vegetation, approaching, perhaps, nearer to that of Chiloe Island; yet there were some Californian[5] and a few New Zealand plants—*Tetragonia expansa*, the *Zanthoxylum*, three species of *Peperomia*, and three species of tree-ferns are examples. Twelve to fifteen species of ferns had taken possession of more than half of the ground; the rest was either wooded or wholly denuded of plants. A Palm, known in the country by the name of "Chonta," inhabited the slopes of the highest mountains. Bertero did not see the flower before it was blown, but believed this Palm should constitute a new genus.

Resina, highly estimated in Chili on account of its reputed medicinal properties, is a

[1] Notice sur l'Histoire naturelle de l'île Juan Fernandez, extraite d'une lettre de M. Bertero: *Annales des Sciences Naturelles*, xxi. 1830, p. 344.

[2] Caldcleugh in Hooker's *Botanical Miscellany*, iii. p. 303.

[3] Guillemin's *Archives de Botanique*, i. et ii., and Delessert's Icones Selectæ Plantarum, iv.

[4] Plantæ Rariores in Regionibus Chilensibus a Clarissimo M. D. Bertero nuper detectæ et ab A. Colla in lucem editæ.—*Memorie della Reale Accademia della Scienze di Torino*, xxxvii., 1834, pp. 41–85; xxxviii., 1835, pp. 1–42, 117–142; xxxix., 1836, pp. 1–56.

[5] This is a mistake; the two or three ferns Bertero supposed to be the same as Californian are not so.

gum-resin yielded by a small tree which he took to be a *Senecio*. This resin exudes from the branches and trunk, and under the influence of the air it solidifies and becomes brittle; and when thrown into fire it exhales an odour like that of incense. Two kinds were distinguished, called "Resina macho" and "Resina hembra" [literally male and female resin —*Robinsonia thurifera* and *Robinsonia gayana* respectively]. The product of the Macho was called "Resina," and that of the Hembra "Incensa." Bertero was of the opinion that there might be two species confounded, for the leaves of the latter are narrower, the disk-flowers are yellow, and the ray-flowers deep red, and the heads in cymes, while in the former the flower heads are corymbose and wholly yellow. Another small tree of the same genus, called "Resinilla," is a new species [*Robinsonia gracilis*]; this affords no resin. A rather tall tree of the Eupatoriaceæ seemed to him to be totally unknown [*Rhetinodendron berteroi*]; it also furnished a gum-resin having the odour of incense. *Myrtus ugni* of Molina [*Myrtus selkirkii*] was found on the high mountains. *Hippotis triflora* [*Coprosma*], a tree of medium size, was very common; and the tree called Peralillo [*Psychotria pyrifolia*] belongs to the same family. It has a trunk four times larger than that of the *Hippotis*. What was called "Manzano" in the island is a species of tree-nettle [*Bœhmeria excelsa*] growing from ten to twenty feet high. He also found a *Plantago* near *Plantago princeps* [a Sandwich Island species], but different. The Arrayan macho or espinillo [*Rhaphithamnus longiflorus*] is a tree of medium size bearing a fleshy fruit. The Guyacan [*Sophora tetraptera*] differs from the Mayu of Chili in the shape of its leaves; besides, its trunk is of considerable size, while the latter is shrubby. The name *spartioides* was given to an arboreous species of *Colletia* having small and few leaves and white flowers tinged with rose. *Lobelia tupa* was very common; its root is perennial, but the stems are renewed yearly after producing very large flowers of a dazzling red. Another herbaceous species [*Lobelia anceps*], always found growing in clefts of rocks near the sea, was in his opinion new. *Malva umbellata*,[1] and a shrubby *Atriplex*,[2] which he did not see in flower, were only found in Goat Island. A species of *Tillandsia* or of a closely allied genus was met with in the highest mountains, and a *Bromelia* near *Bromelia discolor* was very common on dry exposed rocks, and *Azara "serrata"* was frequent in woods. *Lessonia* [*Eryngium bupleuroides*], a genus of Umbelliferæ near *Astrantia* or *Sanicula*, was a tree eight to ten feet high. A *Berberis* near *Berberis glauca* was known by the name of Michoy, and furnished a very pretty yellow dye. The *Arunda quila*, Molina? [*Chusquea fernandeziana*] was rather common; and the stem of *Gunnera scabra* [*Gunnera glabra* and *Gunnera peltata*] was found as much as ten feet high. The foliage, says Bertero, who confounded two species, is very variable, sometimes peltate, sometimes glabrous, smooth, and even shining. It was called "Panque," and abounded on the banks of streams and in mountain valleys. *Arbutus rigida* [*Pernettya*], known by the name of

[1] *Malva umbellata* (*Sphæralcea umbellata*) is a very showy Mexican plant, which does not grow in South America; and there are no Malvaceæ from Juan Fernandez in any of the collections seen.

[2] This is not in the Kew set of Bertero's plants.

Murtilla, was distinguished by the elegance of its habit. An *Escallonia*, with red flowers, was collected, and leaves of an indeterminable tree without a native name; two species of *Campanula*, one of which Bertero took to be *Campanula gracilis*, Forst. [really *Wahlenbergia berteroi*], and the other a distinct new species. Among the ferns were an arboreous *Lomaria* [*Lomaria procera*] and two or three herbaceous species; an arboreous *Davallia* [*Dicksonia berteroana*]; a *Cyathea*, or neighbouring genus [*Thyrsopteris*]; a genus near *Lycopodium*, and apparently very distinct [*Notarisia lycopodioides*, Colla = *Gottschea berteroana*]; various species of *Polypodium*, among them *Polypodium californicum* [*Polypodium translucens*], *Polypodium pruinatum* [*Alsophila pruinata*], and *Polypodium spectabile* [*Polypodium punctatum*]; a pretty *Aspidium*; *Nothochlæna nivea* [*Nothochlæna chilensis*—scarcely specifically different from *Nothochlæna nivea*]; and three species of *Asplenium*, including *Asplenium magellanicum*.

Salicornia peruviana was only found on the north side of the island. The Mosses, Lichens, and Fungi were very numerous, but it was impossible to determine them on the spot. *Phytoxys acidissima*, Molina? [*Cuminia*], a tree six to eight feet high, merits special study, Bertero says, and may be a different genus. Bertero then speaks of the species of *Rhetinodendron*, *Robinsonia*, and *Dendroseris*, of which he collected five or six species; but as the particulars are given further on under the genus, they may be omitted here.

Among exotic plants that had become thoroughly naturalised and so abundant as to have all the appearance of being indigenous, Bertero mentions *Melissa officinalis*, *Apium petroselinum*, several species of *Medicago*, *Avena sativa*, *Chenopodium anthelminthicum*, and *Physalis peruviana*, which furnished excellent fruit. The peach tree was so abundant that one could hardly form an idea of the quantity of fruit collected; and the fruit was generally good, notwithstanding the half-wild state of the trees. *Cestrum parqui* was frequent near dwelling-houses. Many other fruits were abundant; and *Fragaria chilensis* bore better fruit than in Chili.

Rats were exceedingly numerous, in spite of all that was done to keep them down, and they destroyed much fruit. Goats were present in incalculable numbers, and their flesh was of the most exquisite flavour; a few hogs existed in the valley of La Cueva. Horned cattle were almost extinct; and there were no horses. Domestic pigeons had become wild, and increased to an enormous extent. Very few insects were observed.

Mr Hugh Cuming was an Englishman, who resided for some time at Valparaiso, and afterwards devoted himself to the collection of objects of natural history in Chili, Peru, Panama, and the Philippine Islands, where he made very large collections of dried plants. He appears to have visited the islands, if not in company with Bertero, at least during the stay of the latter, but he did not make by any means so extensive a collection, and was probably there only for a few days. He also went to Masafuera.

The next in succession is Claude Gay, the author of the Flora Chilena, who spent a fortnight in Juan Fernandez early in the year of 1832, and collected what plants he could

at that season. He published[1] some particulars of this collection, which was deposited in the Paris Museum of Natural History. Although the time was short, he met, he says, with many interesting plants, including three or four species of tree-ferns, which were overrunning more and more ground, a new genus of *Drimys*, a *Myrtus*, which he thought might be *Myrtus ugni*, Molina [doubtless *Myrtus selkirkii*], an Urticaceous tree, called "Manzano," a fine *Sophora*, two species of *Gnaphalium*, a *Campanula* [*Wahlenbergia*], a *Zanthoxylum*, an *Arbutus* [*Pernettya*], and even two species of Piperaceæ. He also observed that the Juan Fernandez resin, so famous throughout Chili and Peru, though still unknown to science, was exuded by a new genus of Compositæ, near *Senecio*. Among other plants was a very fine series of ferns, which were very common in the island; "but my most important botanical discovery," he adds, "was five or six species of a genus belonging to the Cichoriaceæ, all of them woody, and ten to twelve feet high." In this discovery, as appears from Bertero's sketch of the vegetation of the island, published three years earlier, he had been anticipated; indeed, Don had already published the genus *Dendroseris* on specimens of a species collected in Masafuera by Cuming.

Mr Philibert Germain, formerly conservator of the Natural History Museum at Valparaiso, paid a visit to Juan Fernandez in 1854, and was there during the latter part of October and the beginning of November, as we learn from Dr R. A. Philippi.[2] There are only a few of Germain's plants at Kew, but, from what Philippi says, he must have made an extensive collection. As already observed, there is no direct evidence in Philippi's writings that he has ever visited the island; yet some of the information in the Bemerkungen does not read like second-hand. In the place cited he enumerates 137[3] vascular plants, belonging to forty-three orders, or an average of about three species to each order. Among them are thirty-six species of ferns, constituting 26·3 per cent. of the whole; twenty-three Compositæ = 16 per cent.; and ten Gramineæ = 7 per cent. Philippi's list includes, besides several certainly introduced plants, such as *Rumex acetosella*, *Aira caryophyllea*, and *Anthoxanthum odoratum*, descriptions of twenty-eight proposed new species, several of which are regarded as varieties in this work, whilst a few others are synonyms of previously described species, as subsequently ascertained in part by hilippi himself. A few notable omissions are inexplicable, such, for instance, as *Balbisia*[4] (*Rhetinodendron*) and *Lobelia tupa*, except that they were overlooked in the haste of compilation. We extract a few particulars relating to the condition of the vegetation at that date. The

[1] Aperçu sur les recherches d'histoire naturelle faites dans l'Amérique du sud, et principalement dans le Chili, pendant les années 1830 et 1831, *Annales des Sciences Naturelles*, xxviii. pp. 369–393.

[2] Bemerkungen über die Flora der Insel Juan Fernandez, *Botanische Zeitung*, September 1856, pp. 625–636, 641–650, 818–819. This article was originally read before the Universidad de Chile on July 12, 1856, and published in Spanish in the July number (1856) of the *Anales de la Universidad de Chile*. There is also a French version in the *Annales des Sciences Naturelles*, série 4, vii. p. 87.

[3] Since the publication of this list, Dr Philippi has proposed and described a number of new species of Juan Fernandez plants in various periodicals.

[4] Subsequently mentioned by him in his general remarks on the vegetation.

western half, which is relatively low, flat, and dry, was almost treeless, while the eastern half, especially the northern declivity, was almost entirely covered with shady evergreen forests, above which waved the graceful leaves of the slender Chonta Palm. These recalled the beautiful groves of the southern provinces of Chili, yet they were at once distinguishable by the absence of underwood and climbing plants, which render the forests of Valvidia so impenetrable, as well as by the enormous quantities of ferns, whose fallen fronds thickly covered the ground.

Since that date, however, the trees have been very extensively felled, and the time is probably not far distant when all accessible parts will be denuded.

Philippi remarks that not a single shrub or tree is common to Juan Fernandez and the mainland of South America; but he regards the insular form of *Sophora* as distinct both from the Chilian and the New Zealand. If none be common to Chili and Juan Fernandez, there are several insular species which are closely allied to continental ones; thus *Drimys*, *Berberis*, *Azara*, *Gunnera*, *Myrtus*, *Psychotria*, *Pernettya*, *Rhaphithamnus*, and *Loranthus*. The same thing obtains for many of the herbaceous genera, and what is very remarkable, in nearly all instances the insular species are handsomer and especially larger-flowered than the corresponding continental ones.

The collection of plants in the Kew Herbarium made by Mr E. C. Reed was purchased in 1873, and we learn from the labels that he was in Masafuera in 1869, and in Juan Fernandez in 1872, but there are no other particulars.

Finally, there is the collection made by Mr Moseley in his capacity of naturalist to the Challenger Expedition. This, including a few introduced species, comprises 105 species of vascular plants, besides a small number of cellular cryptogams. It contains no novelties among the vascular plants except a *Wahlenbergia*, which, however, was represented in the Kew Herbarium by one specimen collected in 1823 by Mrs Graham, though hitherto not distinguished from *Wahlenbergia fernandeziana*. But, considering the number of botanists that have visited the island, novelties were not to be expected; and the fuller material it contains of many rare species is most welcome and useful.

Mr Moseley's remarks[1] on the vegetation give an idea of its condition ten years ago, and afford the latest published information on the subject. They are reproduced here with some slight modifications, such as the substitution of different botanical names in a few instances where a critical examination of the plants has brought to light the fact that they had not been correctly identified.

"The voyage to Juan Fernandez occupied six weeks, as we had the bad fortune to be becalmed for twelve days on the passage. It was with the liveliest interest that we approached the scene of Alexander Selkirk's life of seclusion and hardship, and an island with the existence of which, in the case of most of us, the very fact that we were at sea on a long voyage was more or less distinctly connected. The study of Robinson Crusoe certainly first gave me a desire to go to sea, and Darwin's Journal settled the matter. Defoe was obliged to lay the scene of his romance in the West Indies

[1] Notes by a Naturalist on the Challenger, pp. 537–542.

in order to bring in the Carib man, Friday. He thus gained the parrot, but he lost the sea-elephants and fur-seals of Juan Fernandez, one of the latter of which would have made a capital pet for Crusoe.

"The island is most beautiful in appearance. The dark basaltic cliffs contrast with the bright yellow-green of the abundant verdure; and the island terminates in fantastic peaks, which rise to a height of about 3000 feet. Especially conspicuous is a precipitous mass which backs the view from the anchorage at Cumberland Bay, and which is called from its form 'El Yunque' (the anvil).

"There are upwards of twenty-four species[1] of ferns growing in this small island, and in any general view the ferns form a large proportion of the main mass of vegetation. Amongst them are two tree-ferns, one of which I only saw amongst the rocks in the distance, but could not reach. The preponderant ferns, especially the tree-ferns, give a pleasant yellow tinge to the general foliage. Curiously enough, the almost cosmopolitan common brake-fern (*Pteris aquilina*) does not occur in the island. Four species of the ferns out of the twenty-four present are peculiar to the island, and one, *Thyrsopteris elegans*, is of a genus which occurs only here. The appearance of this fern is very remarkable, for the cup-shaped sori hang down from the fronds in masses, looking just like bunches of millet seed.

"Everywhere, for the first few hundred feet, trees are absent, the wood having been all felled. In 1830 a large quantity of dry old sandalwood still remained in the valleys; but even then there were no growing sandalwood trees remaining. No doubt the general appearance of the vegetation is very different now from what it was when the island was first visited.

"I landed and climbed with a guide a steep path leading directly up from the bay to Selkirk's Monument. The island is rented from the Chilian Government as a farm by a Chilian who employs a number of labourers and rears cattle, and grows vegetables, doing a very fair trade with passing vessels, the crews of which, like our own, after a voyage from such a port as Tahiti, long for a little wholesome fresh food. A considerable sum is also realised by the sale of the skins of the fur-seals. Close to the farmhouse at the bay still remain a row of old caves dug out in the hillside by the buccaneers.

"In ascending the path the first tree was met with at about 700 feet altitude, all below had been cut down. We passed through a hollow overgrown by a dense growth of the gigantic rhubarb-like *Gunnera peltata*. Darwin remarked on the large size of the leaves of this plant and height of its stalks as seen by him in Chili.[2] The stalks of the plants he saw were not much more than a yard in height. In this hollow the stalks must have been seven feet in height. We walked through a narrow passage cut in a thicket of them with the huge circular leaves above our heads. The leaves catch and hold a large quantity of rain-water. The size attained by the *Gunnera* varies with its situation. In many places the leaves are very conspicuous on the hill-slopes, crowding closely as an undergrowth, and not rising high above the ground.

"It was now spring in Juan Fernandez, as at Tahiti. Most excellent strawberries grow wild about the lower slopes of the island, and especially well on banks beneath the cliffs close to the sea-shore. The strawberries are large and fine, but white in colour, being, I believe, a Spanish cultivated variety. If so, they have not all reverted to the parent wild form, either in colour or size; a few only were just beginning to ripen.

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[1] Altogether forty-four species are recorded from the island, of which eight are apparently endemic.—W. B. H.

[2] Journal of Researches during the Voyage of H. M. S. "Beagle," p. 279. London, 1879.

"At this time of the year the foliage of the myrtles, though evergreen, looks half-dead, and these trees thus show out conspicuously amongst the rest. Here and there examples of the Magnoliaceous tree (*Drimys confertifolia*), a tree closely allied to one common in the Straits of Magellan, were covered with showy white flowers, and large patches of a small species of dock (*Rumex*) in full flower showed out red amongst the general green, whilst a white-flowered Iridaceous plant (*Libertia formosa*) growing socially formed well-marked patches of white. A tall Verbenaceous shrub (*Rhaphithamnus longiflorus*) which was very common was covered with dark blue tubular flowers.

"Hovering over the flowering bushes and trees, were everywhere to be seen two species of humming-birds; one of which (*Eustephanus fernandensis*) is peculiar to the island, whilst the other (*Eustephanus galeritus*), of the same genus, occurs also on the mainland. A further closely allied but peculiar species occurs in the island named by the Spaniards Masafuera, or "farther out," because it lies ninety miles to the westward of Juan Fernandez and so much farther from the Chilian coast.

"The humming-birds were extremely abundant, hovering in every bush. In the species peculiar to the island of Juan Fernandez, the male is very different in plumage from the female, being of a chocolate colour, with an iridescent golden-brown patch on the head, whilst the female is green. So different are the two sexes that they were formerly supposed to represent two distinct species, as has happened in the case of so many other birds. This endemic humming-bird seemed more abundant than the continental one. Any number of specimens might have been shot.

"In skinning some of the birds which I killed, I noticed that the feathers at the base of the bill and on the front of the head were clogged and coloured yellow with pollen. The birds, no doubt, in common with other species of humming-birds and other flower-frequenting birds, such as the Myzomelidæ, are active agents in the fertilisation of plants. I noticed pollen attached in a similar manner to the Swallow-shrike (*Artamus leucopygialis*), at Cape York. Mr Wallace concludes that the presence of these birds, as fertilisers, accounts for the abundance of conspicuous flowers in Juan Fernandez.

"There are very few insects in the island, according to the observations of Mr E. C. Reed, and only one very minute species of bee. Flies, of which there are twenty species, form the most prominent feature of the entomology of the island. Some fertilisers, either insects or birds, must act on a very comprehensive and effectual scale all over the island, as follows from the abundance of fruit yielded by the various introduced plants.

"Strawberries, cherries, peaches, apples, and figs bear well; strawberries and peaches at all events very abundantly. The wild peaches are spreading everywhere. These, the cherries and the apples, are possibly fertilised by the birds, but one would hardly suppose that the strawberries would be also thus pollenised; though at a height of 9000 feet in the Andes, I have watched humming-birds, possibly the same species as that at Juan Fernandez, hovering over the low mountain flowers, quite close to the ground, where nothing like a bush was growing.

"It would be very interesting, if it proved to be the case, that humming-birds have in this distant island adapted themselves to the fertilisation of our common garden fruits. Besides the fruit trees, there are many introduced plants with well-developed flowers which thrive in the island; a thistle is very abundant and luxuriant, as if eager to remind travellers to what race the world owes the immortal Selkirk, and a wild turnip is rapidly spreading. Possibly the abundant flies take some share in the fertilising work.

"It must be remembered, with regard to insular floras, that a plant which had developed showy

flowers to attract certain insects on some mainland or other place where insects were abundant, might, when transferred to an island devoid of insects suitable to its requirements, nevertheless retain its gaudy flowers, little, or not at all impaired, for an indefinite period, just as animals which have taken to deep-sea life have some of them retained their colours, though living in the dark.[1]

"Selkirk's Monument is placed on the crest of a short sharp ridge in a gap in the mountains at a height of about 1800 feet above the sea. From this, a steep descent leads down on either side to the shore. Here Selkirk sat and watched the sea on both sides of the island in long-deferred hope of sighting a sail.

"Here we rested for some time enjoying the view. Juan Fernandez is only ten miles in length, and twenty square miles in area, and from this elevated point nearly the whole extent of the island could be overlooked. Yet this tiny spot of land contains birds, land-shells, trees, and ferns which occur nowhere else in the vast expanse of the universe, except here or in the neighbouring Masafuera. One could almost count the number of trees of the endemic palm (*Juania australis*), and estimate the number of pairs of the endemic humming-bird existent, at a bird for every bush. Two of the species of land-birds, and all the twenty species of land-shells of the island, are endemic.

"The temperature at the monument at 11 A.M. was 65° F. A small bat, possibly disturbed by the sound of the gun, was seen to fly past. The common sow-thistle (*Sonchus oleraceus*), the ubiquitous weed, has climbed up the pass, and grows by the monument. The endemic palm has been almost exterminated, excepting in nearly inaccessible places, as on a rock above the monument, where a group of the trees can be seen but not reached.

"The terminal shoot of the palm, especially when cut just before the tree flowers, is excellent to eat; the developing leaf mass being quite white, and tasting something like a fresh filbert. It seemed to me more delicate than that of the shoot of the cocoa-nut. The guide knew where there was a tree remaining in the woods not far above sea-level, and I went with him to it hoping to find it in flower. As it was not, I cut it down for eating, for the guide was only waiting to let it develop further before felling it for that purpose himself. A few seedling palms grew near by.

"Most remarkable in appearance amongst the endemic arboreous Compositæ are the species of the genus *Dendroseris*, allied to our chicory. The specimens which I saw in flower were rather large straggling shrubs than trees, but with thick woody stems, and branches from ten to fifteen feet in height. The leaves are very like those of a dandelion in appearance, and the stem, which, when split open, has a curiously chambered pith, has just the smell of a dandelion root, and would no doubt yield chicory. It pours out, like the dandelion and allied plants, a milky juice when cut.

"The flesh of the wild goats of the island is most excellent eating, no doubt because of the abundance of their food. In some parts of the island, especially to the south-west, there are open stretches covered with long grass. Pigeons (*Columba œnas*), which are said to have been imported into the island, are common, and feed on the hill-sides in flocks."

The Sandalwood of Juan Fernandez.

Several of the earlier writers allude to the presence of sandalwood in Juan Fernandez, yet no specimen of any kind exists in any of the collections of the plants at Kew or the British Museum. Molina[2] says "the island of Juan Fernandez produces the red, yellow,

[1] Wallace, Tropical Nature, p. 274. London, 1878.

[2] The Geographical, Natural, and Civil History of Chili, English edition, London, 1809, i. p. 137.

and white sandal, the yellow wood, or *Fagus lutea*,[1] and a tree whose genus I am unacquainted with, that produces a species of pepper[2] inferior to that of the East Indies." Beyond this general statement he says nothing, so that we have no evidence that there were living sandalwood trees in the island at the beginning of the present century; but the inference is that there were. Nevertheless, it would seem that nothing except specimens of the wood exist in any Natural History collection. In 1830 Bertero specially searched for it, though in vain. There was still plenty of decayed, half buried trunks. Gay[3] has a definite statement to the effect that it was all completely destroyed, or rather perished, in one and the same year, but he does not cite his authority for it. His words are: "En o tro tiempo [el Santal] era muy comun en la isla de Juan Fernandez, pero perecieron todos en un mismo año y hoy no se encuentra sino troncos muertos; lo mismo sucedió en Inglaterra con el Plátano en el siglo 18." We are left to guess by what agency the sandalwood trees were destroyed, and as he cites the destruction of the true occidental plane in England as a parallel case, it might be supposed that excessive cold was the real or suspected agent. But such an event seems so very improbable that we shall dismiss it without further discussion. It is true that *Santalum album* inhabits a warmer climate, but, as Philippi remarks,[4] the Juan Fernandez sandalwood was almost certainly a different species, and most likely peculiar to the island. The Sandwich Island sandalwood (*Santalum freycinetianum* and *Santalum pyrularium*) and the Fiji sandalwood (*Santalum yasi*) are quite distinct from the tropical Asian *Santalum album*. Yet, as already observed, there is no proof that the Juan Fernandez sandalwood was a *Santalum*. Assuming it to be a species of *Santalum*, it would, in the present distribution of the genus, be a very remote outlier. Unfortunately, there is no specimen of the wood at Kew, so there is no opportunity of examining its structure and comparing it with other kinds of sandalwood. In the place cited above, Philippi states that in 1856 there were still many portions of trunks of sandalwood scattered about the island up to the highest summits of the cliffs, but so weather-worn that only the heart-wood remained. Such a fragment was in the museum at Santiago indicating a tree two feet in diameter. Now, *Santalum album* never, we believe, attains such large dimensions; a diameter of eighteen inches being very uncommon even where it grows most vigorously. Respecting the extinction of the Juan Fernandez sandalwood tree, Philippi says he is utterly unable to account for it. A volcanic disturbance would not single out a certain species, but destroy whole forests; and then it is quite inconceivable that the seed in the ground could be killed by such an agency. He further states that the pieces of sandalwood found in the island often exhibit holes, which are evidently the work of the larva of some Goat-chafer; but at the present time there are no traces in the island of a Goat-chafer of so large a size. The agent of destruction will probably remain unknown, as also of the innumerable dead prostrate trees observed in South Trinidad by Dr Copeland. A

[1] *Zanthoxylum mayu*.—W. B. H.

[2] *Lactoris fernandezia*.—W. B. H.

[3] Flora Chilena, v. (1849), p. 326.

[4] *Botanische Zeitung*, 1856, p. 635.

similar fate seems to be overtaking the Capuchin tree (*Northia seychellarum*) of the Seychelles, where the dying trees of this species are one of the most striking features in the landscape.

With regard to the fact of no seedlings appearing after the whole of the growing generation had been killed or had died off naturally, it may be accounted for in a variety of ways, though the real cause may be overlooked. If Gay's statement that the trees were all killed in one year be correct, the circumstance of not a single seedling surviving in any part of the island is indeed quite inexplicable; for, assuming the goats to be very fond of this particular plant in a young state, there are surely nooks inaccessible even to goats. But the extinction of the Juan Fernandez sandalwood was probably due to another cause. Many of the Santalaceæ are known to be root-parasites at an early stage of their existence, if not throughout life, and it is very likely that future investigations will prove that most, if not all, of the members of this order are of the same nature. Dr G. King, superintendent of the Calcutta Botanic Garden, assures us, from his own observation, that *Santalum album* is sometimes, at least, parasitic on the roots of other plants when young. This assertion is borne out by the frequent failure of cultivators to raise seedlings of this plant when its seeds are sown alone, and also by the fact that its usual habitat in a wild state is in hedges and thickets. Dr Brandis[1] mentions that it grows in gardens in various parts of India, and he adds that it is mainly spread through the agency of [redacted] and springs up abundantly in hedges and in the midst of shrubs. But that it is not always so is evident from the fact that germinating seeds sent from Ceylon to Mauritius in 1877 have since grown and fruited twice a year. On the other hand, as we learn from an article in the current volume of the Indian Forester, decaying vegetable matter is necessary for the successful raising of seedling sandalwood. The editor of the serial named inserts the following note (p. 205) on this subject:—"Colonel Doveton, conservator of forests, found sandal seedlings growing as a root-parasite on the wild date palm (*Phœnix sylvestris*); and such seedlings were more vigorous than others rooted independently in the soil." Nadeaud states that the Tahitian Sandal wood (*Santalum insulare*, Bertero) is parasitic on the roots of other trees, usually on *Commersonia eclimata* or *Alphitonia ziziphoides*.[2]

At Kew seedlings are frequently raised, but they are always very slender, and after reaching about a foot in height they die. A few years ago, however, a plant of considerable size existed in the gardens, the history of which we have not been able to ascertain. It would be interesting to have the life-history of *Santalum album* thoroughly investigated.

To return to the sandalwood of Juan Fernandez. The most probable cause of its extinction was the absence of the conditions necessary for its reproduction from seed. The enormous flocks of goats may have indirectly contributed to the destruction of the sandalwood by consuming the nurse plant. Root-parasites, speaking generally, seem to be able to

[1] Forest Flora of North-West and Central India, p. 399.

[2] Énumération des Plantes Indigènes de l'Ile de Tahiti, p. 47.

prey only upon certain plants, in the absence of which their seeds perish. Should the extinction be due to the cause assigned, then the process would be a gradual one, and not consummated in a single season. Of course, the soundness of the foregoing argument depends upon the odoriferous wood of Juan Fernandez being a true *Santalum*, or a tree of the same nature. Whether the specimen of the wood preserved at Santiago be sufficient to decide this point is uncertain.

Since writing the foregoing, we have accidentally come upon a note by Philippi, in which he states that he is informed by Commander Simpson, of the Chilian navy, that the tree-fellers of Juan Fernandez had lately felled a living tree of the sandalwood, the trunk of which was eighteen inches in diameter.[1]

An Analysis of the Phanerogamic and Fern Vegetation of Juan Fernandez and Masafuera.

The foregoing paragraphs contain the substance of the botanical results separately of the various travellers who have visited the islands, and we are now in a position to deal with these results collectively, and give a general review of the flora.

Table showing the Geographical Distribution of the Vascular Plants of Juan Fernandez and Masafuera, including a few probably naturalised Species, which are indicated below.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
Magnoliaceæ.				
Drimys confertifolia	Tree	×	...	Endemic.
Berberideæ.				
Berberis paniculata	Shrub	×	...	Endemic.
Berberis corymbosa	Shrub	×	...	Endemic.
Cruciferæ.				
Cardamine chenopodifolia	Herb	×	...	Uruguay and Entre Rios.
Cardamine flaccida	Annual herb	×	...	South America; and closely allied forms widely spread.
Bixineæ.				
Azara fernandeziana	Shrub	×	...	Endemic.
Caryophylleæ.				
Stellaria cuspidata	Herb	×	...	Mexico to Chili, and very near the Old World *Stellaria nemorum*.
Sagina chilensis	Annual herb	×	...	Common in Chili.
Spergularia rubra	Annual herb	×	×	Widely spread in temperate regions.
Portulaceæ.				
Monocosmia corrigioloides	Annual herb	×	...	Common in Chili.
Geraniaceæ.				
Oxalis laxa	Herb	×	...	Common in Chili.
Rutaceæ.				
Zanthoxylum mayu	Shrub	×	...	Endemic.

[1] *Botanische Zeitung*, 1870, p. 502.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
RHAMNACEÆ.				
Colletia spartioides . . .	Small tree	×	...	Endemic.
LEGUMINOSÆ.				
Sophora tetraptera . .	Tree	×	×	South America; Easter Island; New Zealand.
ROSACEÆ.				
Fragaria chilensis . . .	Herb	×	...	Chili; Western North America; Sandwich Islands.
Margyricarpus setosus . .	Under shrub	×	...	Andes, from New Grenada, southward, and extratropical South America.
Acæna argentea . . .	Herb	×	...	Chili.
SAXIFRAGEÆ.				
Escallonia callcottiæ . .	Shrub	×	...	Endemic.
HALORAGEÆ.				
Haloragis alata . . .	Herb	×	...	New Zealand; Eastern temperate Australia.
Gunnera insularis . . .	Herb	×	...	Endemic.
Gunnera bracteata . . .	Arboreous in habit	×	...	Endemic.
Gunnera peltata . . .	Arboreous in habit	×	...	Endemic.
MYRTACEÆ.				
Myrtus fernandeziana . .	Tree	×	...	Endemic.
Myrtus selkirkii . . .	Tree	×	...	Endemic.
FICOIDEÆ.				
Tetragonia expansa . . .	Herb	×	...	Australia; New Zealand; Japan; South America?
UMBELLIFERÆ.				
Eryngium bupleuroides . .	Small tree	×	...	Endemic.
Eryngium sarcophyllum . .	Shrub or small tree	...	×	Endemic.
Sanicula liberta . . .	Herb	×	...	Chili and Peru.
Daucus australis . . .	Biennial herb	×	...	Chili.
RUBIACEÆ.				
Coprosma triflora . . .	Shrub	×	...	Endemic.
Psychotria pyrifolia . . .	Tree	×	×	Endemic.
COMPOSITÆ.				
Erigeron fruticosus . . .	Half shrub	×	×	Endemic.
Erigeron rupicolus . . .	Half shrub	...	×	Endemic.
Micropsis nana . . .	Annual herb	×	...	Chili.
Gnaphalium cheiranthifolium .	Herb	×	...	Widely spread in South America.
Gnaphalium insulare . .	Herb	...	×	Endemic?
Gnaphalium fernandezianum .	Herb	×	×	Probably = *Gnaphalium berterianum*, a Chilian species.
Galinsoga parviflora . .	Annual herb	×	...	A common weed in America.
Rhetinodendron berteroi . .	Shrub or small tree	×	...	Endemic.
Robinsonia evenia . . .	Shrub or small tree	×	...	Endemic.
Robinsonia gayana . . .	Shrub or small tree	×	...	Endemic.
Robinsonia gracilis . . .	Shrub or small tree	×	...	Endemic.
Robinsonia longifolia . .	Shrub or small tree	×	...	Endemic.
Robinsonia macrocephala .	Shrub or small tree	×	...	Endemic.
Robinsonia thurifera . .	Shrub or small tree	×	...	Endemic.
Dendroseris berteriana . .	Shrub or small tree	×	...	Endemic.
Dendroseris macrophylla . .	Shrub or small tree	×	×	Endemic.
Dendroseris marginata . .	Shrub or small tree	×	...	Endemic.
Dendroseris micrantha . .	Shrub or small tree	×	...	Endemic.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
Dendroseris mollis	Shrub or small tree	×	...	Endemic.
Dendroseris neriifolia	Shrub or small tree	×	...	Endemic.
Dendroseris pinnata	Shrub or small tree	×	...	Endemic.
Dendroseris sp. ?	Shrub or small tree	×	...	Endemic.
CAMPANULACEÆ.				
Lobelia anceps	Herb	×	...	Extratropical South America; South Africa; Australia; New Zealand.
Lobelia tupa	Herb	×	...	Chili and Peru.
Wahlenbergia fernandeziana	Herb or half shrub	×	...	Endemic.
Wahlenbergia grahamæ	Herb or half shrub	×	...	Endemic.
Wahlenbergia tuberosa	Herb	...	×	Endemic.
Wahlenbergia berteroi	Herb	×	...	Endemic.
ERICACEÆ.				
Pernettya rigida	Shrub	×	×	Endemic.
PRIMULACEÆ.				
Centunculus pentandrus	Annual herb	×	...	West Indies; Central and South America; Africa; East Indies; Australia.
POLEMONIACEÆ.				
Collomia gracilis	Herb	×	...	British Columbia to California, and in Chili.
BORAGINEÆ.				
Selkirkia berteroi	Shrub	×	...	Endemic.
CONVOLVULACEÆ.				
Calystegia tuguriorum	Herb	...	×	Chili; New Zealand.
SOLANACEÆ.				
Solanum tuberosum	Herb	×	...	South America.
Solanum fernandezianum	Herb	×	...	Perhaps a wild form of *Solanum tuberosum*.
Solanum furcatum	Herb	×	...	Peru.
Physalis pubescens	Herb	×	...	Now widely dispered.
Nicotiana cordifolia	Herb	×	...	Endemic.
SCROPHULARINEÆ.				
Mimulus parviflorus	Herb	×	...	Chili.
VERBENACEÆ.				
Rhaphithamnus longiflorus	Small tree	×	×	Endemic.
Rhaphithamnus serratifolius	Small tree	×	...	Endemic.
LABIATÆ.				
[illegible]minia brevidens	Tree	×	...	Endemic.
[illegible]minia eriantha	Tree	×	...	Endemic.
[illegible]minia fernandezia	Tree	×	...	Endemic.
PLANTAGINEÆ.				
[illegible]ago fernandezia	Miniature tree	×	...	Endemic.
CHENOPODIACEÆ.				
[illegible]ieva multifida	Herb	×	...	South America.
[illegible]rnia peruviana	Herb	×	×	Western South America.
PIPERACEÆ.				
Lactoris fernandezia	Shrub	×	...	Endemic.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
Peperomia fernandeziana	Herb	×	...	Endemic.
Peperomia berteroana	Herb	×	...	Endemic.
Peperomia margaritifera	Herb	×	...	Endemic.
SANTALACEÆ.				
Santalum sp.?	Tree	×	...	Uncertain.
LORANTHACEÆ.				
Loranthus berteroi	Shrub	×	...	Endemic.
EUPHORBIACEÆ.				
Dysopsis gayana	Herb	×	...	Chili; Patagonia.
URTICACEÆ.				
Urtica masafueræ	Herb	...	×	Endemic?
Urtica glomerulæflora	Shrub	×	...	Endemic.
Boehmeria excelsa	Tree	×	...	Endemic.
Parietaria debilis	Herb	×	...	Widely dispersed.
BROMELIACEÆ.				
Ochagavia elegans	Herb	×	...	Endemic.
IRIDEÆ.				
Libertia formosa	Herb	×	×	Chili.
PALMÆ.				
Juania australis	Tree	×	...	Endemic.
JUNCACEÆ.				
Juncus microcephalus	Herb	×	...	Mexico to Uruguay and Chili.
Juncus acutus	Herb	×	...	Europe; Africa; South America.
Juncus dombeyanus	Herb	×	...	Chili.
Juncus chamissonis	Herb	×	...	South America.
CYPERACEÆ.				
Cyperus reflexus	Herb	×	...	South America.
Cyperus vegetus	Herb	×	...	South America.
Cyperus sp.	Herb	×	...	Uncertain.
Scirpus nodosus	Herb	×	...	Widely dispersed in the southern hemisphere.
Cladium scirpoideum	Herb	×	...	Endemic.
Uncinia douglasii	Herb	×	×	Endemic.
Carex paleata	Herb	×	×	Endemic.
GRAMINEÆ.				
Paspalum distichum	Herb	×	...	Widely dispersed, including Chili.
Phalaris intermedia	Herb	×	...	Carolina to Chili.
Stipa fernandeziana	Herb	×	...	Endemic.
Stipa bicolor	Herb	×	...	Extratropical South America.
Piptochætium bicolor	Herb	×	...	Mendoza, Monte Video.
Polypogon crinitus	Herb	×	...	Widely dispersed.
Nowodworskya imberbis	Herb	×	...	Endemic?
Chætotropis chilensis	Herb	×	...	Chili.
Trisetum laxum	Herb	×	...	Endemic?
Trisetum variabile	Herb	×	...	Widely diffused.
Pantathera fernandeziana	Herb	×	×	Endemic.
Podophorus bromoides	Herb	×	...	Endemic.
Bromus unioloides	Herb	×	...	Widely diffused.
Hordeum nodosum	Herb	×	...	Widely diffused.
Chusquea fernandeziana	Herb	×	...	Endemic.

Name.	Duration or Habit.	Distribution.		
		Juan Fernandez.	Masafuera.	General.
FILICES.				
Gleichenia cryptocarpa	Herb	×	...	Chili to the Falklands.
Gleichenia revoluta	Herb	×	...	New Grenada to Chili.
Thyrsopteris elegans	Shrub	×	...	Endemic.
Alsophila pruinata	Tree	×	...	Mexico to Chili.
Dicksonia berteroana	Tree	×	...	Endemic.
Hymenophyllum cruentum	Herb	×	...	Chili to Patagonia.
Hymenophyllum dichotomum	Herb	×	×	South Chili.
Hymenophyllum fuciforme	Herb	×	...	Valdivia; Chiloe; Fuegia.
Hymenophyllum polyanthos	Herb	×	...	Widely dispersed in the Tropics, also common in New Zealand.
Hymenophyllum rarum	Herb	×	...	Chili; South Africa; New Zealand;
		×	...	Tasmania.
Hymenophyllum reniforme	Herb	×	...	Ecuador; Northern Peru.
Hymenophyllum subtilissimum	Herb	...	...	Extratropical South America; New Zealand.
Hymenophyllum tortuosum	Herb	×	...	Extratropical South America.
Hymenophyllum tumbridgense	Herb	×	...	Generally dispersed.
Trichomanes dichotomum	Herb	?	...	Valdivia?
Trichomanes exsectum	Herb	×	×	Valdivia; Chiloe.
Trichomanes pyxidiferum	Herb	×	...	Widely spread in warm regions.
Adiantum æthiopicum	Herb	×	...	Widely spread in warm regions.
Pteris comans	Herb	×	...	New Zealand; Australia; Polynesia.
Pteris chilensis	Herb	×	...	Chili.
Pteris incisa	Herb	×	...	Widely spread.
Pteris marattiæfolia	Herb	?	...	Chili.
Lomaria attenuata	Herb	×	...	Widely spread.
Lomaria blechnoides	Herb	×	...	Valdivia; Chiloe.
Lomaria lherminieri	Herb	×	...	West Indies to Chili.
Lomaria alpina	Herb	×	...	South temperate regions except South Africa.
Lomaria boryana	Herb	×	...	West Indies to Fuegia, Africa, Mascarene Islands.
Lomaria capensis	Herb	×	...	Widely dispersed.
Blechnum australe	Herb	×	...	Widely dispersed.
Asplenium lunulatum	Herb	×	...	Generally spread in warm regions.
Asplenium macrosorum	Herb	×	...	Endemic.
Asplenium magellanicum	Herb	×	...	Chili to Fuegia.
Asplenium obtusatum	Herb	×	...	South temperate regions.
Aspidium aculeatum	Herb	×	...	Generally diffused.
Aspidium capense	Herb	×	...	Tropics and south temperate regions.
Aspidium flexum	Herb	×	...	Endemic.
Nephrodium villosum	Herb	×	...	Peru; Chili.
Nephrolepis altescandens	Herb	×	...	Endemic.
Polypodium lanceolatum	Herb	×	...	Widely spread.
Polypodium punctatum	Herb	×	...	Widely spread.
Polypodium translucens	Herb	×	...	Endemic.
Polypodium masafueræ	Herb	...	×	Endemic.
Gymnogramme elongata	Herb	×	...	Mexico to Chili.
Nothochlæna chilensis	Herb	×	...	Endemic.

The 118 flowering plants in the foregoing table may be classified as follows:—Certainly indigenous, seventy; possibly indigenous, thirty-two; and very doubtfully indigenous, sixteen. It will occupy very little space to give the names of the plants belonging to each of these categories, and so they may follow here. The certainly indigenous element of the flora is restricted to the endemic species, which are:—*Drimys confertifolia, Berberis*

corymbosa, Berberis paniculata, Azara fernandeziana, Zanthoxylum mayu, Colletia spartioides, Escallonia callcottiæ, Gunnera insularis, Gunnera bracteata, Gunnera peltata, Myrtus fernandeziana, Myrtus selkirkii, Eryngium bupleuroides, Eryngium sarcophyllum, Coprosma triflora, Psychotria pyrifolia, Erigeron fruticosus, Erigeron rupicolus, Gnaphalium insulare, Gnaphalium fernandezianum, Rhetinodendron berteroi, Robinsonia evenia, Robinsonia gayana, Robinsonia gracilis, Robinsonia longifolia, Robinsonia macrocephala, Robinsonia thurifera, Dendroseris berteriana, Dendroseris macrophylla, Dendroseris marginata, Dendroseris micrantha, Dendroseris mollis, Dendroseris neriifolia, Dendroseris pinnata, Dendroseris sp.? *Wahlenbergia fernandeziana, Wahlenbergia grahamæ, Wahlenbergia tuberosa, Wahlenbergia berteroi, Pernettya rigida, Selkirkia berteroi, Solanum fernandezianum, Nicotiana cordifolia, Rhaphithamnus longiflorus, Rhaphithamnus serratifolius, Cuminia brevidens, Cuminia eriantha, Cuminia fernandezia, Plantago fernandezia, Lactoris fernandezia, Peperomia fernandeziana, Peperomia berteroana, Peperomia margaritifera, Santalum* sp.? *Loranthus berteroi, Urtica masafueræ, Urtica glomerulæflora, Boehmeria excelsa, Ochagavia elegans, Juania australis, Cladium scirpoideum, Uncinia douglasii, Carex paleata, Stipa fernandeziana, Nowodworskya imberbis, Trisetum laxum, Pantathera fernandeziana, Podophorus bromoides,* and *Chusquea fernandeziana.*

These seventy species belong to forty genera and twenty-six natural orders, and are remarkable for the large proportion of trees and shrubs they include. Thus, deducting the grasses and sedges, of which there are nine species, out of the remaining sixty-one species, forty-six, or more than two-thirds, are shrubby or arboreous. Of trees affording timber for building and joinery, Philippi mentions *Drimys confertifolia, Zanthoxylum mayu, Myrtus fernandezianus, Sophora tetraptera,* and the species of *Cuminia. Rhaphithamnus,* one species of *Dendroseris, Eryngium bupleuroides,* and *Psychotria pyrifolia* also attain a considerable thickness of trunk, whereas the species of *Gunnera,* of *Robinsonia* and the Palm rarely have trunks more than eight inches through.

The additional possibly indigenous species[1] are:—* *Cardamine chenopodifolia,* * *Stellaria cuspidata,* * *Spergularia rubra,* * *Sophora tetraptera,* * *Fragaria chilensis,* * *Margyricarpus setosus, Acæna argentea,* * *Holoragis alata, Tetragonia expansa, Sanicula liberta, Gnaphalium cheiranthifolium, Lobelia anceps, Lobelia tupa, Calystegia tuguriorum,* * *Salicornia peruviana,* * *Dysopsis gayana, Parietaria debilis,* * *Libertia formosa,* * *Juncus microcephalus,* * *Juncus acutus,* * *Juncus dombeyanus,* * *Juncus chamissonis,* * *Cyperus reflexus, Cyperus vegetus, Scirpus nodosus, Paspalum distichum,* * *Stipa bicolor, Piptochætium bicolor,* * *Chætotropis chilensis,* * *Trisetum variabile,* and *Bromus unioloides.*

The very doubtfully indigenous species are:—*Cardamine flaccida, Sagina chilensis,*

[1] Those species preceded by an asterisk (*) have perhaps as strong claims to be considered indigenous as any plant not actually endemic can have.

Monocosmia corrigioloides, Oxalis laxa, Daucus australis, Micropsis nana, Galinsoga parviflora, Centunculus pentandrus, Collomia gracilis, Solanum tuberosum, Solanum furcatum, Physalis pubescens, Mimulus parviflorus, Roubieva multifida, Polypogon crinitus, and *Hordeum nodosum.*

In addition to the plants included in the foregoing list, Mr Moseley collected a number of evidently introduced species, as—*Ranunculus muricatus, Silene gallica, Stellaria media, Malva nicæensis, Geranium robertianum, Geranium dissectum? Ruta graveolens,* var. *bracteosa, Medicago denticulata, Lythrum græfferi? Bidens chilensis, Hypochæris glabra, Sonchus oleraceus, Plantago major, Rumex acetosella, Avena hirsuta, Poa annua, Briza minor, Festuca bromoides,* and *Festuca myurus.*

Amongst the seventy species classed as endemic are about half a dozen so near Chilian species that they might with equal propriety be regarded as races of the same species; these include apparently some of Philippi's species, such as *Gnaphalium insulare* and *Gnaphalium fernandezianum*, of which there are, however, no authentically named specimens at Kew. Making a slight deduction on this account, and adding about fifteen of the non-endemic wild species, concerning which there can be little doubt that they are indigenous, the number of indigenous flowering plants in Juan Fernandez and Masafuera would amount to about seventy-five.

Table showing the General Distribution of the Genera of Phanerogamic Plants of which there are Indigenous Species in Juan Fernandez or Masafuera.

Name.	Distribution.	Name.	Distribution.
1. Drimys	Mexico to Brazil and Chili; New Zealand, Australia, New Caledonia, and mountains of Borneo.	11. Eryngium	Especially numerous in America from the southern United States to Chili; and generally dispersed in temperate and subtropical regions, except South Africa.
2. Berberis	Temperate and subtropical regions of the northern hemisphere, including one species in Abyssinia, and in America, especially Western, from Oregon to Tierra del Fuego; but not represented in the Australasian region.	12. Coprosma	Most numerous in New Zealand and the Sandwich Islands; fewer in Oceania and Australia.
3. Cardamine	Temperate regions generally.	13. Psychotria	A very large genus, generally dispersed in the tropics; the greatest concentration of species in America.
4. Azara	Chili.	14. Erigeron	Widely dispersed.
5. Zanthoxylum	Nearly all tropical and subtropical regions.	15. Rhetinodendron	Endemic.
6. Colletia	South America.	16. Robinsonia	Endemic.
7. Sophora	Widely diffused in temperate and tropical regions.	17. Dendroseris	Endemic.
8. Escallonia	Andine and extratropical South America.	18. Lobelia	Generally diffused.
9. Gunnera	Mexico to Patagonia; South Africa, Abyssinia, Java, Tasmania, New Zealand, and Sandwich Islands.	19. Wahlenbergia	Widely dispersed; species most numerous in Africa; few in South America; several similar species in St Helena.
10. Myrtus	Widely dispersed; the species most numerous in South America.	20. Pernettya	Mexico to Fuegia, and one or two species in New Zealand and Tasmania.
		21. Selkirkia	Endemic.
		22. Rhaphithamnus	Chili.

Name.	Distribution.	Name.	Distribution.
23. Cuminia . .	Endemic.	38. Cladium . . .	Widely dispersed in tropical and temperate countries; species most numerous in Australia and New Zealand.
24. Plantago . . .	Generally diffused.		
25. Salicornia . .	Generally diffused in maritime districts.		
26. Lactoris . . .	Endemic.	39. Uncinia . . .	South temperate and cold regions, and through the Andes to Mexico and the West Indies, also Sandwich Islands.
27. Peperomia . .	Widely dispersed in warm countries, with a great concentration of species in America.		
28. Santalum . .	Tropical Asia, Australia, and Pacific Islands.	40. Carex	Generally diffused.
		41. Stipa	Widely diffused.
29. Dysopsis . . .	Peru and Chili; monotypic.	42. Piptochætium .	The same as *Oryzopsis*, which has a wide range in the northern hemisphere, and recurs in South America.
30. Urtica	Widely diffused.		
31. Boehmeria . .	Widely dispersed in tropical and temperate regions.		
32. Ochagavia . .	Endemic (Order wholly American.)	43. Chætotropis . .	Chili.
33. Libertia . . .	Chili, Australia, and New Zealand.	44. Pantathera . .	Endemic.
34. Juania . . .	Endemic.	45. Podophorus . .	Endemic.
35. Juncus . . .	Cosmopolitan.	46. Chusquea . .	Panama and the West Indies to Chili.
36. Cyperus . . .	Generally dispersed.		
37. Scirpus . . .	Generally dispersed.		

Out of forty-six genera of flowering plants represented in Juan Fernandez, twenty are so generally diffused as not to be specially characteristic of any particular region, north or south, east or west; ten are endemic; seven are otherwise restricted to South America, or do not extend further north than Mexico; five (*Drimys*, *Gunnera*, *Pernettya*, *Libertia*, and *Uncinia*) are represented both in the Australian and South American regions; two (*Coprosma* and *Santalum*) are represented in the Australian but not in the South American region; and two (*Berberis* and *Piptochætium*) have a wide range in the northern hemisphere, extending southward, however, only in America, where the species of the former genus are numerous and diversified.

The Vascular Cryptogams.

Including *Trichomanes dichotoma*, Philippi, and *Pteris semiadnata*, Philippi = *Pteris marattiæfolia*, Hook., there are forty-four species of ferns in Juan Fernandez; but, as stated elsewhere, authentic specimens of these two ferns, direct from Philippi, in the Kew Herbarium, are labelled Valdivia, although with the published descriptions he records them both as natives of Juan Fernandez. The probabilities are that the labels are right and the published record wrong, for there are no specimens of either of them in the Kew Herbarium from the island, but there are some of the latter from Chili. Be this as it may, the fern vegetation of Juan Fernandez is much richer in species than that of St Helena, which comprises twenty-five species. On the other hand, the proportion of endemic species in Juan Fernandez is much smaller than in St Helena, there being at the outside only eight, or less than one fifth of the whole, whereas in St Helena half of the species are endemic. Upwards of thirty of the Juan Fernandez species also inhabit South America, many of them having a much wider range, while only one of the New Zealand species reaches Juan

Fernandez that does not reach Chili, namely, *Pteris comans*. The endemic element of Juan Fernandez offers nothing remarkable except the monotypic genus *Thyrsopteris*, which is perhaps as markedly characterised as any genus of ferns: the number of monotypic genera of ferns, as limited in Hooker and Baker's Synopsis, is small.

The total absence of the genus *Lycopodium*[1] is one of the most unexpected facts in connection with the vegetation of Juan Fernandez, for two or three species abound in most of the islands dealt with in the preceding parts of this work. The very widely spread *Psilotum* is apparently likewise wanting.

Very Rare or Extinct Plants.

A considerable number of species collected by Bertero in 1830, or by collectors who preceded him, are not in any of the more recent collections examined; hence it may be inferred that they are either very rare and local, or that they have disappeared altogether. They are:—*Colletia spartioides, Myrtus selkirkii, Psychotria pyrifolia, Robinsonia macrocephala, Robinsonia thurifera, Dendroseris berteriana, Dendroseris marginata, Dendroseris micrantha, Dendroseris mollis, Dendroseris neriifolia, Wahlenbergia berteroi, Peperomia margaritifera, Loranthus berteroi, Urtica glomerulaflora, Polypogon crinitus, Bromus cebadilla, Polypodium punctatum.*

Another proof of the very local occurrence of many of the species is the fact that several other species collected either before or since Bertero's time, are only found in one collection. A striking example is offered by *Podophorus*, a very distinct endemic monotypic genus of grasses, of which we have seen only one specimen sent to Kew by Dr Philippi. Again, *Robinsonia macrocephala*, Dene., collected by Gay, is in none of our collections.

The Plants of Masafuera.

There appears to be no published description of the general features of the vegetation of Masafuera, but it is evidently very scanty, and a fragment of the same flora as Juan Fernandez. The plants are:—*Spergularia rubra, Sophora tetraptera, *Eryngium sarcophyllum, Psychotria pyrifolia, Erigeron fruticosus, *Erigeron rupicolus, *Gnaphalium insulare, Gnaphalium fernandezianum, Dendroseris macrophylla, *Wahlenbergia tuberosa Pernettya rigida, Calystegia tuguriorum, Rhaphithamnus longiflorus, Salicornia peruviana, *Urtica masafueræ; Libertia formosa, Uncinia douglasii, Carex paleata, Pantathera fernandeziana, Hymenophyllum dichotomum, Trichomanes exsectum, *Polypodium masafueræ.*

Altogether, twenty-two vascular plants are recorded from Masafuera, and of these six are apparently peculiar; all the rest, except *Calystegia tuguriorum*, being common to this island and Juan Fernandez. We have seen no authenticated specimens of *Erigeron*

[1] *Lycopodium saururus* is recorded by Spring (Monogr. Lycop. ii. p. 7) from Cumberland Bay, Juan Fernandez; but, as the label in the Kew Herbarium indicates, it should have been Cumberland Bay, Kerguelen Island.

rupicolus, *Gnaphalium insulare*, and *Polypodium masafueræ*, but from the descriptions they are not markedly distinct from Juan Fernandez forms. Of the remarkable *Eryngium sarcophyllum*, there are only Cuming's specimens at Kew.

Concluding Remarks on the Flora of Juan Fernandez and Masafuera.

Although there is a disproportionately large endemic element, both generic and specific, in the vegetation of this island, its general affinities are decidedly Chilian, as an examination of the table (pp. 20, 21) will prove; and the number of genera common to the Tasmanian and New Zealand region and South America, represented in the island, strengthens the opinion, advanced elsewhere, that formerly the vegetation of each of the southern cold and temperate zones was essentially of the same composition throughout. Numerous other facts might be adduced in support of this theory, and there is one that strikes us as being strongly conclusive—namely, the generic identity of the principal trees of the existing colder forests of the two regions. Beech (*Fagus*) forests of different, though closely allied species, are as characteristic of New Zealand, Tasmania, and some parts of the mountains of temperate Australia as they are of Southern Chili and Patagonia. Furthermore, the Coniferous genera are the same in the two regions. Thus, the essential characters of the *Diselma* of Tasmania and *Fitzroya* of South America are said to be the same in the latest revision of the genera in Bentham and Hooker's Genera Plantarum, where the former is merged in the latter. Further, *Libocedrus*, *Dacrydium*, and *Araucaria* are all three represented in the Australasian and South American regions.

But in Juan Fernandez, as in St Helena, it is the endemic genera that offer the greatest difficulties to the botanical geographer; indeed, there are strong features of resemblance in the endemic genera as well as some of the species of the two islands—the genera of Compositæ and the species of *Wahlenbergia* are examples. We propose discussing the affinities and distribution of arboreous Compositæ in our general introduction; therefore we shall not enter into full particulars here, and only repeat what we have said of the St Helena arboreous plants belonging to this and other natural orders, that they are not specially insular, though they form so large a proportion of the floras of St Helena, Juan Fernandez, the Sandwich Islands, and some other islands. There are scores of them in South America, Africa, Madagascar, India, and Australia, from twenty to forty feet high, and more truly arboreous than the insular ones; and there are a few even taller. It is noteworthy that there are arboreous representatives of nearly every tribe or suborder of the Compositæ. Like the South African arboreous genera *Tarchonanthus* and *Brachylæna*, *Rhetinodendron* and *Robinsonia* are apparently diœcious, but the former are referred to the Inuloideæ, and the latter to the Senecionideæ. In habit, *Dubautia* (Helianthoideæ) of the Sandwich Islands is quite like the Juan Fernandez genera just named; while *Dendroseris* is in a manner repeated by the subarboreous species of *Sonchus* in the Canary Islands.

One peculiarity observed in dried specimens of some species of *Robinsonia* may be

mentioned, though it may possibly not be exhibited by the living plant. The pappus falls from the achenes while they are still in or attached to the receptacle, and the bracts of the involucre are apparently hygroscopic, and when dry, bend over the achenes and prevent them from being dispersed. Of course, this and many other points connected with reproduction can only be verified on the spot.

The endemic arboreous genus *Cuminia* of the Labiatæ has dimorphic, functionally unisexual flowers, intermixed in the same inflorescence, the males largely predominating. It is very closely allied to *Bystropogon*, a genus of upwards of a dozen mostly shrubby species, and some of considerable size, inhabiting the Canary Islands and Western South America. Describing the size of the trunks of several of the Juan Fernandez trees, including the species of *Cuminia*, Philippi states[1] that they are often one to three feet in diameter; but, judging from what Bertero and others say of the size of the species of *Cuminia*, a foot would be the outside diameter of the trunk of any of them. Arboreous Labiatæ are very rare; probably the largest are some South American species of *Hyptis*. A Brazilian species, *Hyptis membranacea*, is stated by Gardner to be a tree thirty to forty feet high; another species, *Hyptis arborea*, a native of British Guiana, New Granada, and Ecuador, grows from twenty to thirty feet high. There are also several large shrubby or subarboreous Labiatæ in India, as *Colebrookia*, *Elsholtzia*, and *Meriandra*.

The shrubby Boraginaceous plant, which we have removed from *Cynoglossum* and raised to the rank of a distinct genus, under the name *Selkirkia*, is allied to the Chatham Island monotypic *Myosotidium* in structure, but very different in habit.

Of all the endemic plants, however, the genus *Lactoris* is the most distinct, being so unique in its structure that its place in the natural system is not easily determined. Philippi referred it to the Magnoliaceæ; but Bentham and Hooker have no doubt correctly placed it in the tribe Saurureæ of the Piperaceæ, though it differs from all the other genera in the flowers having a distinct perianth, and in being solitary or two or three together, instead of being naked and closely packed in racemes or spikes. Associated with these anomalous structural characters, it has the knotted branches and the aromatic taste and smell of a *Piper*.

The structure of the flowers and fruit of the endemic palm *Juania australis* is still very imperfectly known; male flowers have not been described, nor has the fruit. It is to be hoped that no opportunity of obtaining complete specimens will be lost.

Among other endemic plants, *Eryngium bupleuroides* has analogues in the South European *Bupleurum fruticosum*, and in the African genera *Heteromorpha* and *Steganotænia*. There are shrubby species of *Plantago* in South America, but *Plantago princeps* of the Sandwich Islands comes nearest *Plantago fernandezia*.

Another feature in the flora of Juan Fernandez is the almost total absence of Leguminosæ; this it shares in common with New Zealand as well as many of the oceanic islands

[1] *Botanische Zeitung*, 1856, p. 634.

dealt with in this work. Although Orchids are either absent or very rare in all oceanic islands, their total absence from Juan Fernandez is remarkable, because there are several in the Falklands, which are nearly as far from the mainland; and in the islands lying near New Zealand (Lord Auckland, Campbell, and Chatham Islands) there is nearly as large a proportion as in the main island. Coniferæ, too, are wholly absent, as in the Auckland, Campbell, and other islands near New Zealand, as well as in all of the islands coming within the scope of this work, from Fernando Noronha to Amsterdam and St Paul Islands.

In addition to the collections of Juan Fernandez plants mentioned at p. 2, a small one has recently been presented to the Kew Herbarium by Messrs Veitch, nurserymen, of King's Road, Chelsea. This collection was made by Mr. Downton, who travelled for the firm named, and whose special mission was the introduction of living plants of an ornamental character. It comprises between thirty and forty species, including one, *Convolvulus tuguriorum*, not in any of the other collections. They were partly from Juan Fernandez and partly from Masafuera. We have also seen living plants of *Dendroseris macrophylla*, *Wahlenbergia tuberosa* (of which only the foliage was known before), and *Libertia formosa*, introduced by Mr Downton from Masafuera.

In conclusion, we have one more source of information to record. It is the book entitled Crusoniana, or Truth versus Fiction, elucidated in a History of the Islands of Juan Fernandez by the retired Governor of that Colony, a copy of which was purchased for the Kew Library while these sheets were undergoing revision. The author of this remarkable book, which was published in 1843, was Thomas Sutcliffe, an Englishman, who was Governor for a time during the period Juan Fernandez was used by the Chilian Government as a penal settlement. Besides the author's personal knowledge, it contains a condensed history of the island from various sources, commencing with an account of Alexander Selkirk's sojourn there. We have extracted two or three interesting notes on the vegetation.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—ANGIOSPERMÆ.

DICOTYLEDONES.—POLYPETALÆ.

MAGNOLIACEÆ.

Drimys confertifolia, Philippi.

Drimys confertifolia, Philippi in Bot. Zeit., 1856, p. 641.
Drimys chilensis, Gay, Fl. Chil., i. p. 61, partim.
Drimys fernandeziana, Miers in Ann. Nat. Hist., 1858, ser. 3, ii. p. 48, et Contrib. Bot., i. p. 137, t. 27.

JUAN FERNANDEZ.—Endemic. One of the commonest trees of the woods on the hills and mountains—*Bertero;* without remarks—*Germain; Cuming; Reed;* here and there —*Moseley.*

Until recently this tree, in books at least, has been associated with the sufficiently distinct *Drimys chilensis;* yet Bertero, who made the earliest considerable collection of plants in the island that has been used for the purposes of this report, recognised it as different from the Continental species. The label accompanying his specimens in the Kew Herbarium bears the following inscription—"*Drimys a chilensi, DC. diversa. Vulgo Canelo. In sylv. coll. et mont.*"

Drimys comprises about ten or a dozen species, whereof one or two are American, ranging from Chili to Brazil and Mexico; one inhabits New Zealand, two Australia, four or five New Caledonia, and one the mountains of Borneo. As a genus it is very distinct, and it affords an example of those southern generic types which are neither peculiarly American nor Old World; and besides being represented in South America and Australasia, extend considerably northward in both hemispheres.

BERBERIDEÆ.

Berberis paniculata, Philippi.

Berberis paniculata, Philippi in Descr. Nuevas Plantas, 1872, p. 6.

JUAN FERNANDEZ.—Endemic. A single shrub found—*Philippi.*

Philippi states that this is easily distinguished from *Berberis corymbosa* by its coriaceous, narrower, reticulated leaves, glaucous below, by the shorter petiole, the leafy peduncles, &c.

Berberis corymbosa, Hook. et Arn.

Berberis corymbosa, Hook. et Arn. in Hook. Bot. Misc., iii. p. 135; Gay, Fl. Chil., i. p. 82; Philippi in Bot. Zeit., 1856, p. 627.

JUAN FERNANDEZ.—Endemic—*Douglas; Mrs M. Graham; Cuming*, 1338; *Reed; Moseley.*

Apparently common in the island, as it is in all collections. The genus *Berberis* is numerous in species, which are spread all round the northern hemisphere, and in America from Canada to Fuegia, chiefly in the great mountain chain; but none is found south of the equator in the Old World. One species occurs in Africa as far south as Abyssinia. Gay enumerates upwards of twenty species in his Flora Chilena, many of which are very distinct. The insular species exhibit no marked characteristics, and are not very different from some of the continental ones.

CRUCIFERÆ.

Cardamine chenopodifolia, Pers.

Cardamine chenopodifolia, Pers., Synop. Pl., ii. p. 195; DC. Prodr., i. p. 149; St Hil., Fl. Bras. Merid., ii. p. 121, t. 106.
Heterocarpus fernandezianus, Philippi in Bot. Zeit., 1856, p. 641.

JUAN FERNANDEZ. *Germain; Reed.*

Also a native of Uruguay, in the neighbourhood of Monte Video, and other parts, and of Entre Rios, growing even in salt water, according to Gibert, who collected it at Punta Brava.

This is one of those remarkable *amphicarpic* plants, belonging to various natural orders, which produce two kinds of seed-vessel; hence Philippi's name. Besides the ordinary linear pod of the genus, containing numerous seeds and borne on the erect stems, *Cardamine chenopodifolia* usually has a number of others at the base of the stem of totally different shape and consistence, each containing one, or sometimes two seeds, which are larger than those in the normal pods. There are no specimens in the Kew Herbarium bearing flowers at the base of the stem, but it is probable that here, as in other plants exhibiting this singular provision, the short, thick-pointed seed-vessels proceed from cleistogamic flowers. The plant is of annual duration, or, to be more explicit, flowers only once, and, as described, buries some of its own seed, thus ensuring its existence. The Chilian *Cardamine cordata*, Gay, is near, but different from this species, which does not appear to have been found on the western side of the continent.

The late Dr A. Grisebach, of Göttingen, had an opportunity of studying the develop-

ment of this interesting plant under cultivation, the results of which were published,[1] and are here repeated in a condensed form. Seeds were sent to the Göttingen Botanic Garden from the Argentine province of Entre Rios, and both kinds were equally fertile, though the young plants from the seeds of underground pods grew more vigorously from the first than the others did. Nevertheless, by the time the plants reached the flowering stage this difference had disappeared. The underground pods contain one,[2] or, at most, two relatively large seeds; while in the normal aërial pods, the seeds are numerous and small. Probably the greater vigour of the plants from the seeds ripened underground was due to the greater amount of nourishment they abstracted from the mother plant. Briefly, a plant of *Cardamine chenopodifolia* may be described as similar to a plant of the common *Cardamine pratensis*, but it has entire leaves; and from the axils of the rosette of leaves at the base of the stem spring the peduncles of the flowers which ripen their seeds underground. These bear each one terminal flower, produced at the same time as the ordinary erect inflorescence. Almost as soon as they are visible, they begin to curve downward, and before the flowering period they have thrust themselves into the ground to the average depth of four-fifths of an inch. The flowers are so small as to be almost imperceptible to the naked eye, for they only attain a length of a millimetre (about one twenty-fifth of an inch), with a diameter of a thirty-second part of an inch, looking more like the blunt end of a peduncle, especially as they remain closed. But the normal flowers are also very small, having petals only about one-sixth of an inch long. Whereas, however, these exhibit the ordinary Cruciferous structure, the underground ones consist of only four green sepals, with four stamens apparently opposite to them, and a pale pistil. The latter contains one pendulous anatropal ovule in each cell. Exceptionally a peduncle is unable to penetrate the ground, and then the pod lies flat on the ground, and is green instead of being blanched. The process of fertilisation of the underground flowers, which was investigated by Dr Drude, proved far more remarkable than the abnormal structure of the flowers. The accuracy of the observations Dr Grisebach was able to confirm by an examination of Dr Drude's microscopic preparations. It appears that each cell of the anther contains only about twelve pollen grains of globular shape, with tetrahedrously-arranged pores and a thin warty extine. The anther cells do not dehisce, but the pollen tubes grow out and pierce the wall, and at once enter the contiguous stigma. In the ovary, the pollen tubes could be traced into the micropyle of the ovule, which was already impregnated, though the pollen tubes remained visible. A comparison of the individual pollen grains of the underground flowers with pollen grains of the aërial flowers revealed

[1] Der Dimorphismus der Fortpflanzungsorgane von Cardamine chenopodifolia, Pers.—*Nachrichten von der Königlichen Gesellschaft der Wissenschaften und der G. A. Universität zu Göttingen*, Juni 1878, p. 332; reprinted in the *Botanische Zeitung*, 1878, pp. 723 and 794.

[2] The ovary of the flowers that bury themselves appears to be invariably two-celled, with one ovule in each cell; and Grisebach states that, contrary to St Hilaire's account, both ovules were fertilised in the cultivated plant, but in all the wild specimens we examined, except one, only one seed was developed.—W. B. H.

the same structure in both, with the noteworthy physiological difference that the latter exuded a viscous substance by which they clung together in clusters. This provision, as we learn from Kerner's admirable observations, is only made where cross fertilisation is effected by insects, being unknown in anemophilous flowers. So it may be assumed that there is cross fertilisation of the expanded flowers of different plants, and it is known from actual observation that self-fertilisation takes place in the underground closed flowers. The cultivated plants produced underground fruits, which were as large as those represented in St Hilaire's figure, but Dr Grisebach does not state whether another generation was raised from the seed.

With regard to the purpose of these underground seeds, Dr Grisebach hints that it may be to ensure the reproduction of the plant in a locality where the prolonged droughts might otherwise jeopardise its existence. *Cardamine chenopodifolia* is a monocarpic, or what is more commonly called an annual plant, and the buried seeds would retain their vitality long after the parent had perished and the seed produced above ground had been dispersed or destroyed; and then when the rains returned the buried seeds would germinate. But this explanation is hardly sufficient, if we take into account the natural habitat of the plant. St Hilaire says: "Nascitur in pascuis maritimis;" and on Gibert's label in the Kew Herbarium, as already mentioned, there is the memorandum: "Croit jusque dans l'eau salée." Therefore it would seem more probable that the purpose is to prevent the seed being carried away by the water. We find another provision for this purpose in many of the Mangroves (*Rhizophora* spp. &c.), the seeds of which germinate while still in the seed-vessel attached to the parent plant; and the thick, heavy radicle goes on elongating until its combined weight and length bring it down to the mud, in which it soon takes a hold, and the plumule begins to grow, and the connection with the parent is severed. On the other hand, many other plants exhibit the same phenomenon, and some of them grow in quite dry localities; so it is not safe to generalise as to the advantages enjoyed by them therefrom. In fact, it is a subject awaiting thorough investigation, for doubtless some plants have retained the faculty after they have ceased to derive any benefit from it. Seeds thus sunk in the earth are not only protected from drought or water, as the case may be, but also from birds and many graminivorous animals that do not burrow.[1]

Cardamine flaccida, Ch. et Schl.

Cardamine flaccida, Ch. et Schl. in Linnæa, i. p. 21.
Cardamine bonariensis, Pers., Synopsis Pl., ii. p. 195; DC., Prodr., i. p. 150.

JUAN FERNANDEZ. *Douglas; Moseley.*

There is some doubt whether the Juan Fernandez plant be really *Cardamine flaccida*, inasmuch as it is to us uncertain whether that is a distinct species or merely a form of

[1] For further particulars on this subject see Dyer in *Nature*, xvii., 1878, p. 446.

the widely-spread and variable *Cardamine hirsuta*. The former was founded on a Chilian plant collected at Talcagua, and is not different from plants named *Cardamine nasturtioides* in the Kew Herbarium. In a broad sense a number of the South American forms of *Cardamine* belong to *Cardamine hirsuta*, which is also represented in Australia and New Zealand by at least an equal series of varieties. The Tristan da Cunha *Cardamine propinqua* of Carmichael (Trans. Linn. Soc. Lond., xii. p. 507) would appear to be the same as *Cardamine flaccida*, for since writing the account of the botany of the Tristan group, we have seen a specimen of a *Cardamine* raised by Mr Mitten from seed in the earth attached to some of the mosses brought home by Mr Moseley, which is exactly like the *Cardamine* collected in Juan Fernandez by Douglas and Moseley. Of course, there is just the possibility of an error in the origin of Mr Mitten's plant, which he sent to Kew with the following note:—"I shook out all the dust from the Tristan da Cunha mosses, and have raised therefrom a *Cardamine* very like the Azoric *Cardamine caldeirarum*." The last named is a critical species of the *Cardamine hirsuta* type, and said to be most nearly allied to *Cardamine sylvatica*, which in its turn is at most a sylvan subspecies of *Cardamine hirsuta*. Carmichael compares his plant with *Cardamine antiscorbutica*, Banks, which is reduced in Hooker's Flora Antarctica to *Cardamine hirsuta*, as is also *Cardamine propinqua*. Whatever rank be assigned to these southern forms of *Cardamine*, the presence of one in the Tristan da Cunha group merely counts as an additional species of a type common to the American and Australasian regions.

BIXINEÆ.

Azara fernandeziana, Gay.

Azara fernandeziana, Gay, Fl. Chil., i. p. 196; Philippi in Bot. Zeit., 1856, p. 627.

Juan Fernandez.—Endemic. In woods on the higher mountains—*Bertero*, 1436; without locality—*Reed*.

Allied to the common Chilian *Azara serrata*, Ruiz and Pavon, and apparently rare. Excluding a doubtful West Indian plant, and another Mexican one, *Azara* is restricted to Chili, and consists of about a dozen species.

CARYOPHYLLEÆ.

Stellaria cuspidata, Willd.

Stellaria cuspidata, Willd.; DC., Prodr., i. p. 396; Gay, Fl. Chil., i. p. 264.

Juan Fernandez.—In moist woods of the higher mountains—*Bertero*; *Reed*; *Moseley*.

Common in Western America from Mexico to Chili. This is very near to, if not the same as, the European *Stellaria nemorum*.

Sagina chilensis, Gay.

Sagina chilensis, Gay, Fl. Chil., i. p. 282; Philippi in Bot. Zeit., 1856, p. 628 (*Sagina chilensis*, Naud.)

JUAN FERNANDEZ.

Common in the central provinces of Chili, according to Philippi, on whose authority alone it is recorded from Juan Fernandez.

Spergularia rubra, Presl.

Spergularia rubra, Presl.; Benth., Fl. Austral., i. p. 161.
Arenaria rubra, Linn., Sp. Pl., ed. i. p. 423; var. *polyphylla*, Philippi in Bot. Zeit., 1856, p. 642.
Spergularia polyphylla, Rohrb. in Linnæa, xxxvii. p. 232 (species).

JUAN FERNANDEZ; MASAFUERA.—Common, and in all collections from Bertero's time to the present.

Widely spread in temperate regions, both north and south, though perhaps originally introduced into the southern hemisphere. Rohrbach designates the Juan Fernandez plant as "Species ab omnibus seminum testa structura distinctissima. Tuberculi enim omnibus ceteris speciebus semper sunt multo longiores quam latiores, forma cylindrica, ad apicem versus dilatata. . . . In nostra autem specie tuberculi sunt humiles, sed ad axin unam valde dilatate, quasi vermiformes et sæpe paullum curvati."

PORTULACEÆ.

Monocosmia corrigioloides, Fenzl.

Monocosmia corrigioloides, Fenzl. in Ann. Wien Mus., ii. p. 297; Gay, Fl. Chil., ii. p. 477; Philippi in Bot. Zeit., 1856, p. 628.
Talinum monandrum, Ruiz et Pav., Prodr. Fl. Peruv., p. 65.
Calandrinia monandra, DC., Prodr., iii. p. 359.
Corrigiola deltoidea, Hook. et Arn., Bot. Beech. Voy., p. 24.

JUAN FERNANDEZ, ex *Philippi*.

Not uncommon in the central and southern provinces of Chili, whence it may have been introduced into the island. An annual herb, in none of the Juan Fernandez collections consulted. The only species of the genus.

GERANIACEÆ.

Oxalis laxa, Hook. et Arn.

Oxalis laxa, Hook. et Arn., Bot. Beech. Voy., p. 13; Gay, Fl. Chil., i. p. 447; Philippi in Bot. Zeit., 1856, p. 628.

JUAN FERNANDEZ. *Germain; Reed; Moseley.*

One of the commonest and most widely spread species in Chili. The insular form is a small one, with smaller flowers than the ordinary continental one.

RUTACEÆ.

Zanthoxylum mayu, Bertero.

Zanthoxylum mayu, Bertero in Ann. Sc. Nat., xxi. p. 345, *nomen tantum*; Hook. et Arn. in Hook. Bot. Miscel., iii. p. 168; Colla in Mem. Accad. Sc. Torino, xxxvii. p. 51, t. 5; Gay, Fl. Chil., i. p. 483; Philippi in Bot. Zeit., 1856, p. 634.

Juan Fernandez.—Endemic. In the mountain woods—*Bertero;* without locality—*Cuming*, 1340; *Germain; Reed; Moseley.*

"Arbor procera, vulgo mayu."—*Bertero.*

Not strikingly different from the South American species.

"This is the largest tree in the island, and the present inhabitants call it 'Naranjillo,' and not *Mayu*, and in the narrative of Lord Anson's voyage it bears the name *Myrta*. The trunk sometimes attains as much as six feet in diameter, and in Lord Anson's time planks of it thirty feet long were sawn out."—*Philippi.*

RHAMNACEÆ.

Colletia spartioides, Bertero.

Colletia spartioides, Bertero in Ann. Sc. Nat., xxi. p. 347, *nomen tantum;* Colla in Mem. Accad. Sc. Torino, xxxvii. p. 52, t. 6; Gay, Fl. Chil., ii. p. 34; Hook., Bot. Miscel., iii. p. 173.

Juan Fernandez.—Endemic. In the higher mountain woods—*Bertero.*

This is described by Bertero as a tree six to ten feet high; it is in none of the later collections at Kew. *Colletia* is an exclusively South American, chiefly Chilian genus; but the closely allied, otherwise South American, *Discaria*, is represented in Australia and New Zealand by one species. *Colletia spartioides* differs from the other species in its arboreous character.

LEGUMINOSÆ.

Sophora tetraptera, Ait.

Sophora tetraptera, Ait.; Hook. f., Handb. Fl. N. Zeal., p. 52 (*varietates plures*); Bot. Mag., t. 167.
Sophora microphylla, Jacq., Hort. Schœnb., t. 269.
Edwardsia microphylla, Salisb. in Trans. Linn. Soc. Lond., ix., p. 299; Bot. Mag., t. 1442; Gay, Fl. Chil., ii. p. 216.
Edwardsia macnabiana, Grah. in Bot. Mag., t. 3735.
Edwardsia fernandeziana, Philippi in Bot. Zeit., 1856, p. 642, et 1873, p. 742.
Edwardsia reedeana, Philippi in Bot. Zeit., 1873, p. 742.
Edwardsia masafuerana, Philippi in Bot. Zeit., 1873, p. 743.

Juan Fernandez; Masafuera. *Bertero; Reed.*

In the sense here given this species inhabits South America, Easter Island, and New Zealand, being exceedingly common and variable in both regions, and exhibiting the same kind of variation in its most distant habitats. Philippi regards the forms as distinct

species, two of them, *Edwardsia fernandeziana* and *Edwardsia reedeana*, being peculiar to Juan Fernandez, and *Edwardsia masafuerana* to Masafuera. He further describes the Easter Island form as an independent species, which he calls *Edwardsia toromiro*, and another Chilian form he raises to the same rank under the name *Edwardsia cassioides*. Whether species or varieties, the genetic connection of all the forms is very close. "Guyacan" is the name applied to *Sophora tetraptera* in Juan Fernandez.

ROSACEÆ.

Fragaria chilensis, Ehrh.

Fragaria chilensis, Ehrh.; DC., Prodr., ii. p. 571; Gay, Fl. Chil., ii. p. 305; Bertero in Ann. Sc. Nat., xxi. p. 350.

JUAN FERNANDEZ.—Common—*Bertero; Reed; Moseley.*

Common in Chili, and in North America from Alaska to San Francisco; also in the Sandwich Islands.

Watson (Botany of California, i. p. 177) states that the North American plant is identical with the Chilian. In the Sandwich Islands it grows high up in the mountains.

Margyricarpus setosus, Ruiz et Pavon

Margyricarpus setosus, Ruiz et Pavon, Fl. Peruv. et Chil., i. p. 28, t. 8; Gay, Fl. Chil., ii. p. 279; Philippi in Bot. Zeit., 1856, p. 628.

JUAN FERNANDEZ.—Barren pastures—*Bertero; Cuming*, 1327; *Moseley.*

Patagonia, through the Andes to New Grenada, and on the eastern side northward to South Brazil.

There are two other species of the genus, one Chilian and the other Peruvian.

Acæna argentea, Ruiz et Pavon.

Acæna argentea, Ruiz et Pavon, Fl. Peruv. et Chil., i. p. 67, t. 103; DC., Prodr., ii. p. 593; Gay, Fl. Chil., ii. p. 294.

JUAN FERNANDEZ. *Reed; Moseley.*

A Chilian plant, not represented in any of the earlier collections from Juan Fernandez, where it may be of recent introduction. The glochidiate prickles of the fruit cling readily to foreign objects, and the seeds are thus often carried long distances.

SAXIFRAGEÆ.

Escallonia callcottiæ, Hook. et Arn.

Escallonia callcottiæ, Hook. et Arn. in Hook., Bot. Misc., iii. p. 342 (1833); Gay, Fl. Chil., iii. p. 58; Engler in Linnæa, xxxvi. p. 549.

Escallonia rubricaulis, Colla in Mem. Accad. Sc. Torino, xxxvii. p. 79 (1834); Rémy in Gay Fl. Chil., iii. p. 57; Engler in Linnæa, xxxvi. p. 578.

Escallonia fernandeziana, Philippi in Bot. Zeit., 1856, p. 644.

Juan Fernandez.—Endemic. Thickets and open woods—*Bertero; Scouler; Douglas; Reed; Moseley.*

There appears to be but one species in the islands, but it varies very much in stature and in foliage, according to the situation in which it grows. Rémy (l. c.) states that Colla records his *Escallonia rubricaulis* from the central provinces of Chili, and Engler repeats it; yet Colla cites only the following remark: "Hab. in fruticetis et sylvaticis apricis collium insulæ Juan Fernandez," which is almost an exact copy of Bertero's label in the Kew Herbarium.

Escallonia numbers between forty and fifty species, restricted to South America, and finds its greatest concentration in Chili.

HALORAGEÆ.

Haloragis alata, Jacq.

Haloragis alata, Jacq., Ic. Pl. Rar., i. t. 69; Hook. f., Handb. Fl. N. Zeal., p. 65; Benth., Fl. Austr., ii. p. 479.
Haloragis cercodia, Ait., Hort. Kew, ed. 1, ii. p. 37; Gay, Fl. Chil., ii. p. 362.
Cercodia erecta, Murr.; DC., Prodr., iii. p. 67.

Juan Fernandez.—Amongst grass and bushes on the hills—*Bertero*, 1464; without locality—*Scouler; Cuming*, 1347; *Mrs Graham; Reed; Moseley.*

Also in New Zealand, New South Wales, and Victoria, but not on the mainland of South America, where the genus is unrepresented. *Haloragis* numbers about forty-two species, thirty-seven of which inhabit Australia, where thirty-three of them are endemic. Four species, one of which is peculiar, occur in New Zealand; one species is found in New Caledonia, and two or three species in the Indian Archipelago, while *Haloragis micrantha* ranges from New Zealand and Australia northward to India, China, and Japan. It is by mistake that Mr Bentham (Flora Australiensis, ii. p. 473) records the genus as South African.

Gunnera insularis, Philippi.

Gunnera insularis, Philippi in Bot. Zeit., 1856, p. 642.

Juan Fernandez.—Endemic (ex *Philippi*).

There are no specimens at Kew answering to the description of this species, which the author states is allied to *Gunnera magellanica*, "differt foliis haud crenatis, sed obscure lobatis, dentibus distantibus munitis, nec non statura multo majore."

Gunnera bracteata, Steud. (Plate LIV.)

Gunnera bracteata, Steud., fide R. Br. in Benn. Pl. Jav. Rar., p. 75; Walp., Rep., ii. p. 100.
Gunnera glabra, Philippi in Bot. Zeit., 1856, p. 643?

Juan Fernandez.—Endemic. Damp, shady places in the higher mountains—*Bertero*, 1463, at least in part; *Germain.*

There is a little uncertainty about this species, arising from the fact that Bertero regarded the insular forms as belonging to *Gunnera chilensis*, Lam. (*Gunnera scabra*, Ruiz et Pavon), and consequently distributed two species under the same number. A specimen in Kew Herbarium without a number labelled "Juan Fernandez, Bertero," in the handwriting of the late Sir William Hooker, agrees with Brown's brief description; but a female inflorescence and a seedling plant about eight inches high can hardly belong to the same species. Bertero's label, bearing the number 1463, is attached to the same sheet, and most likely the specimen figured for this work was sent with the latter as one species, for Bertero (Annales des Sciences Naturelles, xxi. p. 348) says: "La tige du *Gunnera scabra* acquiert dans ce lieu jusqu'à 10 pieds de haut; ses feuilles varient considerablement: j'en ai vu de peltées, de très-glabres, lisses, et même luisantes." Bertero named his specimens *Gunnera scabra*, var. *foliis lævibus*. Philippi describes the inflorescence of his *Gunnera glabra* thus: "Spica fœminea composita, rhachidibus partialibus filiformibus. Flores masculi in pedunculi aderant; an spica semper aut casu tantum androgyna?" Yet his description of the leaf does quite well for *Gunnera bracteata*. The stem, he states, is six feet high. Bertero cites the name "pangue," which belongs to the continental *Gunnera chilensis*, for the insular plant.

Gunnera peltata, Philippi.

Gunnera peltata, Philippi in Bot. Zeit., 1856, p. 642.

JUAN FERNANDEZ. — Endemic. Without locality — *Germain; Reed; Scouler? Moseley?*

The specimens in Kew Herbarium are too imperfect for satisfactory determination, the base of the blade of the leaf being wanting in all cases. There is no doubt that the genuine *Gunnera peltata* is quite distinct from *Gunnera chilensis*, as it has a trunk from twelve to eighteen feet high and distinctly peltate leaves. Among the specimens of *Gunnera* in the Kew Herbarium is one sheet ticketed "Juan Fernandez, Douglas," which seems to be the typical *Gunnera chilensis*; the inflorescence and leaf corresponding exactly to Chilian specimens.

The genus *Gunnera* comprises about fifteen species inhabiting America, from Fuegia and the Falkland Islands to Mexico, Abyssinia, Java, Tasmania, New Zealand, and the Sandwich Islands.

MYRTACEÆ.

Myrtus fernandeziana, Hook. et Arn.

Myrtus fernandezianus, Hook. et Arn. in Hook. Bot. Misc., iii. p. 316; Berg in Linnæa, xxvii. p. 40.
Eugenia fernandeziana, Barneoud in Gay Fl. Chil., ii. p. 392.
Eugenia lumilla, Philippi in Bot. Zeit., 1856, p. 643.

JUAN FERNANDEZ.—Endemic. In mountain woods—*Bertero*, 1484; without locality—*Moseley*.

The specimens collected by Mr Moseley prove that Philippi's *Eugenia lumilla* is not different from the older *Myrtus fernandezianus*. Scouler and Douglas's specimens, quoted by Hooker and Arnott, do not exist at Kew. Philippi relies upon the description in Gay (Flora Chilena, ii. p. 392), "Arbolillo de varios piés de alto" for one of his differences; but Bertero states (Annales des Sciences Naturelles, xxi. p. 345) that the Luma or Temu was one of the commonest trees, sometimes attaining a prodigious size.

Myrtus selkirkii, Hemsl.

Myrtus selkirkii, Hemsl.
Eugenia selkirkii, Hook. et Arn. in Hook. Bot. Misc., iii. p. 318; Gay, Fl. Chil., ii. p. 392.
Ugni ? selkirkii, Berg in Linnæa, xxvii. p. 392.
Myrtus berteroi, Philippi in Bot. Zeit., 1856, p. 644 (*ex descriptione*).
Myrtus ugni, Bertero in Ann. Sc. Nat., xxi. p. 347, non Molina.

Juan Fernandez.—Endemic. In thickets on the highest peaks—*Bertero*, 1480.

We have only seen Bertero's specimen in the Kew Herbarium. The genus is represented by many species in Chili, some of them closely allied to the insular forms; and there are three species in New Zealand.

FICOIDEÆ.

Tetragonia expansa, Murr.

Tetragonia expansa, Murr.; DC., Prodr., iii. p. 452; Gay, Fl. Chil., ii. p. 468; Bertero in Ann. Sc. Nat., xxi. p. 346; Benth., Fl. Austr., iii. p. 325; Hook. f., Hand. Fl. N. Zeal., p. 84.

Juan Fernandez. *Reed.*

Bertero (l. c.) mentions this as an example of a New Zealand plant occurring in Juan Fernandez, but it is probably merely a colonist in the island, as well as in Chili, for Gay's only record is "the neighbourhood of Valparaiso, where Bertero met with it."

UMBELLIFERÆ.

Eryngium bupleuroides, Hook. et Arn.

Eryngium bupleuroides, Hook. et Arn. in Hook. Bot. Misc., iii. p. 352; Gay, Fl. Chil., iii. p. 118; Philippi in Bot. Zeit., 1856, p. 628.
Lessonia, Bertero in Ann. Sc. Nat., xxi. p. 348.

Juan Fernandez.—Endemic. In woody, stony, elevated situations—*Bertero*, 1471; *Mrs Graham; Reed; Moseley.*

This and *Eryngium sarcophyllum* are very distinct species of this widely diffused genus, which is strongly represented in South America.

Eryngium sarcophyllum, Hook. et Arn.

Eryngium sarcophyllum, Hook. et Arn. in Hook. Bot. Misc., iii. p. 352; Gay, Fl. Chil., iii. p. 117.

MASAFUERA.—Endemic. Without any memorandum—*Cuming*, 1355.

We have only seen the one specimen upon which the species was founded.

Sanicula liberta, Ch. et Schl.

Sanicula liberta, Ch. et Schl. in Linnæa, i. p. 253; DC., Prodr., iv. p. 84; Gay, Fl. Chil., iii. p. 109.
Sanicula crassicaulis, Pœppig; DC., Prodr., iv. p. 84.

JUAN FERNANDEZ. *Reed; Moseley.*

A native of Peru and Chili, not in any of the earlier collections from the island, and probably of recent introduction there. We have not seen ripe fruit of this species, but in most of them it is furnished with barbed prickles, and thereby readily conveyed from place to place.

Daucus australis, Pœppig.

Daucus australis, Pœppig in DC., Prodr., iv. p. 214; Gay, Fl. Chil., iii. p. 136; Philippi in Bot. Zeit., 1856, p. 628.

JUAN FERNANDEZ (ex *Philippi*).

Common in Chili, and perhaps of recent introduction in the island, as it does not occur in the early collections.

GAMOPETALÆ.

RUBIACEÆ.

Coprosma triflora, Benth. et Hook.

Coprosma triflora, Benth. et Hook., Gen. Plant., ii. p. 139.
Psychotria hookeri, Don, Gen. Syst. Gard., iii. p. 585; Gay, Fl. Chil., iii. p. 198.
Psychotria triflora, Hook. et Arn. in Hook. Bot. Misc., iii. p. 359, non Schum.
Hippotis triflora, Bertero in Ann. Sc. Nat., xxi. p. 347, non Ruiz et Pavon.

JUAN FERNANDEZ.—Endemic. Very common—*Bertero*, 1466; *Cuming*, 1337; *Reed; Moseley.*

The genus *Coprosma* comprises between thirty and forty species, mostly inhabiting New Zealand and the Sandwich Islands, and a few Oceania and Australia.

Psychotria pyrifolia, Hook. et Arn.

Psychotria pyrifolia, Hook. et Arn. in Hook. Bot. Misc., iii. p. 360; Gay, Fl. Chil., iii. p. 199.

JUAN FERNANDEZ.—In the more elevated mountain woods—*Bertero.* MASAFUERA. *Reed.*

"Peralillo" of the inhabitants of Juan Fernandez, according to Bertero.

COMPOSITÆ.

Erigeron fruticosus, DC.

Erigeron fruticosus, DC., Prodr., v. p. 283; Gay, Fl. Chil., iv. p. 22.
Terranea fernandezia, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 11, t. 23.
Aster erigeroides, Hook. et Arn. in Hook. Comp. Bot. Mag., ii. p. 48, cum β *prolifero*.

JUAN FERNANDEZ. — Woods in the higher mountains — *Bertero;* rocky plain— *Douglas; Cuming*, 1334; *Moseley; Reed; Downton.* MASAFUERA.—*Reed*, collected in 1872.

This species, which is apparently confined to these islands, bears a strong resemblance to the endemic Bermudan *Erigeron darrellianus.*

Erigeron rupicolus, Philippi.

Erigeron rupicolus, Philippi in Bot. Zeit., 1856, p. 644.

MASAFUERA (ex *Philippi*).

We have seen no specimen of this species, which is described as a dwarf, glabrous, suffruticose plant having crowded spathulate leaves on long petioles, and small flower-heads with white rays.

Micropsis nana, DC.

Micropsis nana, DC., Prodr., v. p. 460; Philippi in Bot. Zeit, 1856, p. 629; Gay, Fl. Chil., iv. p. 108.

JUAN FERNANDEZ (ex *Philippi*).

An annual herb, from one to three inches high, otherwise peculiar to Chili, and probably of recent introduction into the island, for it does not exist in any of the collections consulted for this report.

Gnaphalium cheiranthifolium, Lam.

Gnaphalium cheiranthifolium, Lam., Encycl., ii. p. 752; DC., Prodr., vi. p. 223; Baker in Mart. Fl. Bras., fasc. lxxxvii. p. 122 (*varietates plures*).
Gnaphalium paniculatum, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 17, t. 26.
Gnaphalium citrinum, Hook. et Arn. in Bot. Beech. Voy., p. 31; DC., Prodr., vi. p. 223; Gay, Fl. Chil., iv. p. 222.

JUAN FERNANDEZ.—In mountain pastures—*Bertero; Scouler.*

Exceedingly common and widely spread in South America.

Gnaphalium insulare, Philippi.

Gnaphalium insulare, Philippi in Bot. Zeit., 1856, p. 645.

MASAFUERA.—Endemic? (ex *Philippi*).

Cuming's 1353 may be this species, but the genus is a difficult one. Many of the species are weeds of cultivation and waste places, and colonise freely in the most unlikely

places, so that the specific distinctness of this and *Gnaphalium fernandezianum*, from all previously described forms, is problematical, and only to be ascertained by studying the whole of the species of this group of the genus.

Gnaphalium fernandezianum, Philippi.

Gnaphalium fernandezianum, Philippi in Bot. Zeit., 1856, p. 646.

JUAN FERNANDEZ and MASAFUERA. *Philippi.*

Specimens collected in Juan Fernandez by Reed and Moseley agree fairly well with the description; but they are named, perhaps correctly, *Gnaphalium berterianum*, DC., a common Chilian species.

[*Gnaphalium decurrens*, Ives, is recorded (Gay, Fl. Chil., iv. p. 224) from Juan Fernandez, probably through an error in naming. It is a North American species, not unlike, though distinct from, *Gnaphalium cheiranthifolium.*]

Galinsoga parviflora, Cav.

Galinsoga parviflora, Cav., Ic. Pl., iii. p. 41, t. 281; DC., Prodr., v. p. 667; Gay, Fl. Chil., iv. p. 267.

JUAN FERNANDEZ. *Philippi.*

An annual plant generally diffused in cultivated ground, roadsides, &c., in North and South America, as well as in many parts of the Old World, where, however, it is known to have been originally introduced. It is doubtless a colonist in Juan Fernandez.

Rhetinodendron (Meissn.) **berteroi**, Hemsl.

Rhetinodendron (Meissn.) *berteroi*, Hemsl.
Balbisia berterii, DC. in Guill. Archives de Bot., ii. p. 333; DC., Prodr., vi. p. 447; Delessert, Ic. Sel., iv. t. 62; Dcne. in Ann. Sc. Nat., sér. 2, i. p. 16, t. 1.
Vendredia berterii, Baill., Histoire des Plantes, Monogr. Comp., pp. 264 et 265.
Ingenhousia thurifera, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. Shady woods in the higher mountains—*Bertero*, 1407; *Cuming*, 1329; *Reed*; *Moseley.*

As the name *Balbisia* is retained for a genus of Geraniaceæ, it is only right to restore Meissner's appropriate name[1] *Rhetinodendron* for this genus, for there is no doubt that he had the same plant under consideration which De Candolle described and named *Balbisia berterii*. Meissner founded his genus without giving any specific name or citing the collector of the plant he described. By an oversight *Rhetinodendron* was not taken up in the Genera Plantarum of Bentham and Hooker, though Steudel and Pfeiffer both include it as a synonym of *Balbisia*, DC. Baillon, perceiving that the name *Balbisia* was already occupied, replaced it by *Vendredia*, overlooking the fact of the existence of *Rhetino-*

[1] Genera Plantarum, 1839, p. 216.

dendron. From Bertero's specific name, *thurifera*, this tree is doubtless one of those that yield incense, though he quotes no native name for it on his label, merely recording its height as eight to ten feet. Most likely, however, it is the tree referred to by him (Ann. Sc. Nat., xxi. p. 347) in the following sentence:—"Un arbre assez élevé, et de la tribu des Eupatorinées, me paraît tout-a-fait inconnu; il donne une gomme resine qui a aussi la même odeur que l'encens." The "Resina macho" and the "Resina hembra" mentioned are species of *Robinsonia*. No record is to be found of the relative frequency of *Rhetinodendron*; but as it is in the later collections, it is probably not uncommon. Bertero's specimens in the Kew Herbarium include a seedling plant, about fifteen inches high, the leaves of which are shorter, broader, and very coarsely toothed.

Robinsonia evenia, Philippi.

Robinsonia evenia, Philippi in Bot. Zeit., 1856, p. 644.

JUAN FERNANDEZ.—Endemic. *Reed; Moseley; Downton.*

Philippi describes this as a shrub about six feet high. In many of its characters it agrees with Decaisne's *Robinsonia macrocephala*, while in others it is apparently very different. Probably some of these differences are only sexual, and there may be no more than three or four distinct species of *Robinsonia* in the island. The flower-heads are always (?) in all the species (?) unisexual, and, as far as examined, all the flower-heads of a specimen are either male or female; hence it may be assumed that the sexes are borne by different plants. In consequence of this separation of the sexes, it is impossible to limit the species without ample materials, for we cannot tell what other differences the sexes may present. In De Candolle's Prodromus, the bristles of the pappus of *Robinsonia* are described as cohering in a tube nearly half-way up—a condition not found in any of the specimens we have examined. *Robinsonia evenia* differs essentially from the other species in the involucral bracts being free to the base, and it has all the aspect of a true *Senecio*. It may be mentioned that De Candolle named this genus, which is endemic in Juan Fernandez, after Defoe's hero.

Robinsonia gayana, Dcne.

Robinsonia gayana, Dcne. in Ann. Sc. Nat., sér. 2, i. p. 28, t. 1; Delessert, Ic. Sel., iv. t. 64; DC., Prodr., vi. p. 448; Gay, Fl. Chil., iv. p. 126.
Robinsonia corrugata, Philippi in Bot. Zeit., 1856, p. 645.
Senecio thurifer, var. ? Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. Thickets in stony places of the higher mountains—*Bertero; Douglas; Reed; Moseley.*

This species and *Robinsonia thurifera*, Dcne., are not readily distinguishable. Bertero regarded them broadly as one species, yet he points out differences, and suggests that there

were two confounded. His remarks thereon are here translated: "The 'Resina,' which is highly esteemed in Chili on account of its reputed medicinal properties, is a gum-resin yielded by a small tree which I take to be a *Senecio*; it exudes from the trunk and branches, and by exposure to the air becomes solid and brittle; in burning it gives off an odour like that of incense. They distinguish the 'Resina macho' from the 'Resina hembra.' The latter yields less, and it never hardens so much as that of the former. The produce of the Macho is called 'Resina,' while that of the Hembra is called 'Incensa.' Perhaps two species are here confused, for the leaves of the latter are narrower, and the cymose flower-heads are yellow in the disk and deep red in the rays, whereas those of the former are corymbose and wholly yellow. Another small tree of the same genus, called 'Resinilla,' is a new species, which furnishes no resin."

Robinsonia gayana is the "Resina hembra," or female resin, and is apparently still moderately plentiful in the island.

Robinsonia gracilis, Dcne. (Plate LV.)

Robinsonia gracilis, Dcne. in Ann. Sc. Nat., sér. 2, i. p. 29; DC., Prodr., vi. p. 448; Gay, Fl. Chil., iv. p. 127.
Robinsonia micrantha, Philippi MSS. in Herb. Kew.
Senecio stenophyllus, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. Woods in the higher parts of the mountains—*Bertero; Reed; Downton.*

This is the "Resinilla" mentioned under the last species, of which we had only seen Bertero's specimen, represented in our plate, and two small branchlets collected by Mr Reed in 1872, until the arrival of Downton's collection at Kew, since our drawing was made.

Robinsonia longifolia, Philippi.

Robinsonia longifolia, Philippi in Bot. Zeit., 1856, p. 644.

JUAN FERNANDEZ.—Endemic. *Germain.*

No authentically named specimens of this species have come under our observation, but from the description it is very near to, if not the same as, *Robinsonia thurifera*, Dcne.

Robinsonia macrocephala, Dcne.

Robinsonia macrocephala, Dcne. in Ann. Sc. Nat., sér. 2, i. p. 28, t. 1; DC., Prodr., vi. p. 448; Gay, Fl. Chil., iv. p. 125.

JUAN FERNANDEZ.—Endemic. On the mountains—*Gay.*

Decaisne states that this species was founded on a single specimen in the Paris Herbarium, presented by Claude Gay, the author of the Flora Chilena. There is nothing answering to the figure and description in the English collections.

Robinsonia thurifera Dene.

Robinsonia thurifera, Dene. in Ann. Sc. Nat., sér. 2, i. p. 28; DC., Prodr., vi. p. 448; Delessert, Ic. Sel., iv. t. 64; Gay, Fl. Chil., iv. p. 127.
Senecio thurifer, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In stony thickets of the higher mountains—*Bertero.*

The Resina macho, or male resin of the natives, represented in the herbaria consulted by Bertero's specimen only. As observed under *Robinsonia evenia*, it is impossible with the present material to define the species of this genus or to say how many the specimens represent. Whether the "male" and "female" resins of Bertero's collection are of the same species, as supposed by him, and, in a manner, confirmed by Planchon in Kew Herbarium, is perhaps a little uncertain. Planchon determined Bertero's Kew specimens from Decaisne's descriptions and figures, cited above—both the "Resina macho," and "Resina hembra," as *Robinsonia gayana*; possibly because the Kew Resina macho is not male, as described by De Candolle in the Prodromus. The Kew specimen of the Resina macho is apparently a young female, and quite like that represented in Delessert. All the flowers in all the heads of an excellent specimen are of the same sex; and, judging from the solitary specimen, we should think *Robinsonia thurifera* is distinct from *Robinsonia gayana*. Its Dracænoid leaves are double the size, and the inflorescence is different, as well as the flowers and achenes. Among the specimens we should refer to, *Robinsonia gayana* are both male and female; Bertero's original is wholly female, with perfectly ripe seeds containing fully developed embryos with flat, not convolute, cotyledons.

Dendroseris berteriana, Hook. et Arn.

Dendroseris berteriana, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea berteriana, Dene. in Guill. Archives Bot., i. p. 515, t. 10, fig. 2; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 464.
Rea pinnata, var. *insignis* (*forte species distincta*), Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. Woods in the higher mountains at a place called El Yunque—*Bertero.*

The genus *Dendroseris*, or *Rea*, as we should prefer calling it, if we might be permitted to disregard the strict rule of priority in this particular case in order to render tribute to the man who first collected its species and made them known to the scientific world, belongs to the suborder Cichoriaceæ, and is restricted to Juan Fernandez and Masafuera. The earliest record of these singular arboreous Compositæ is to be found in Bertero's sketch of the flora of the island (Ann. Sc. Nat., 1830, xxi. p. 348), the substance of which deserves reproducing: "I had forgotten to mention to you one thing which greatly astonished me; it is the existence of five or six species, which, in my humble opinion, should constitute a new genus. They belong to the Cichoriaceæ, and, if I am not mistaken, are near *Sonchus*. Three of them are trees from ten to fifteen feet high,

with trunks in proportion, hard wood, the branches almost always in threes, and the flower-heads in panicles. In one species the flower-heads resemble in size, shape, and colour, those of *Hypochæris helvetica*. By incision they all exude a thick viscous milky juice in enormous quantity. The stems and branches are hollow; the inflorescence paniculate; the leaves, simple and alternate usually, are pinnate in one species. In this the leaflets vary infinitely; sometimes they are linear and simple or bifurcate, sometimes toothed with the terminal lobe cordiform or reniform, like the leaves of *Caltha palustris* or *Asarum europæum*, but much larger. I think this is the finest discovery I have made." From the foregoing there is no doubt what plants he had in view; but, unfortunately, he proposed no name for the genus, though his manuscript name, *Rea*, probably existed even at that date. In 1833, Decaisne published (Guillemin, Archives de Bot., i. p. 513) Bertero's six species of *Rea*, and described a seventh himself—the *Rea berteriana*, which Bertero regarded as possibly a variety of his *pinnata*. A little more than a year earlier, however, Don (Philosophical Magazine, April 1832) founded *Dendroseris*, on a single species, it is true, yet that entitles him to priority, and we somewhat regretfully follow Hooker and Arnott, who in 1835 reduced Bertero and Decaisne's species of *Rea* to the older published genus *Dendroseris*. In spite of these facts, De Candolle revived the name *Rea* three years later in the Prodromus, on the strength of having seen it in manuscript in Bertero's Herbarium in 1830; and Gay follows him in the Flora Chilena.

Of the present species, *Dendroseris berteriana*, we have only seen Bertero's specimen, collected more than fifty years ago, so it must be very rare, or perhaps even extinct, for so conspicuous and distinct a plant could otherwise hardly have been overlooked by all subsequent collectors.

Dendroseris macrophylla, Don.

Dendroseris macrophylla, Don. in Phil. Mag., 1832, p. 388; Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32; Bot. Mag., t. 6353.

Rea macrantha, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 514, t. 9, fig. A., et 10, fig. 1; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 463.

Juan Fernandez.—Shady woods on the higher mountains—*Bertero; Reed; Moseley.*

Masafuera.—*Cuming*, 1350; *Downton.*

Don founded the genus on a specimen of this species, collected by Cuming, about a year before the publication of Bertero's name *Rea*.

Dendroseris marginata, Hook. et Arn.

Dendroseris marginata, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.

Rea marginata, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 519; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 467.

Juan Fernandez.—Endemic. Rocky woods of the higher mountains, at a place called Portezuelo—*Bertero.*

A distinct species, apparently founded upon specimens destitute of both flowers and fruit. Bertero describes it as a small tree three to six feet high. It is so different from everything else from the island as to be unmistakable. Gay was of opinion that it was the same as *Dendroseris macrophylla*, but it is wholly different.

Dendroseris micrantha, Hook. et Arn.

Dendroseris micrantha, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea micrantha, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 518, t. 9, et t. 10, fig. D.; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 467.

JUAN FERNANDEZ.—Endemic. Shady woods in the higher mountains—*Bertero.*

Another very distinct species, which is wanting in all recent collections. It was one of the taller species collected by Bertero, growing ten to fifteen feet high, and bearing enormous terminal panicles of very small flower-heads.

Dendroseris mollis, Hook. et Arn.

Dendroseris mollis, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea mollis, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 519; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 468.

JUAN FERNANDEZ.—Endemic. Stony woods in the higher mountains, at a place called Portezuelo—*Bertero.*

Like *Dendroseris marginata*, from the same locality, this species was founded on specimens without flower-heads, and it is not in the Kew set of Bertero's plants.

Dendroseris neriifolia, Hook. et Arn.

Dendroseris neriifolia, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea neriifolia, Dcne. in Guill. Archives Bot., i. p. 517; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 466.
Rea leucantha, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In the valley of Pangal—*Bertero.*

Perfectly distinct from all other species, yet not met with in any recent collections.

Dendroseris pinnata, Hook. et Arn.

Dendroseris pinnata, Hook. et Arn. in Hook. Comp. Bot. Mag., i. p. 32.
Rea pinnata, Bert. ex Decaisne in Guill. Archives de Bot., i. p. 516, t. 9, et t. 10, fig. 3; DC., Prodr., vii. p. 243; Gay, Fl. Chil., iii. p. 465.

JUAN FERNANDEZ.—Endemic. In stony mountainous localities—*Bertero; Douglas; Reed; Moseley.*

One of the larger species, reaching a height of fifteen feet and upwards.

Dendroseris sp. ?

Dendroseris, sp. ?

JUAN FERNANDEZ.—Endemic. *Reed.*

In Kew Herbarium is a specimen of a distinct plant, collected, or at least communicated, by Mr E. C. Reed, and bearing a name in the handwriting of Philippi; but we can find no publication of it, and there being only one leaf and portion of an old inflorescence, we cannot describe it.

CAMPANULACEÆ.

Lobelia anceps, Thunb.

Lobelia anceps, Thunb., Prodr. Fl. Cap., p. 40, fide A. DC., Prodr., vii. p. 375; Benth. Fl. Austr., iv. p. 128; Gay, Fl. Chil., iv. p. 325.
Lobelia alata, Labill, Pl. Nov. Holl., i. p. 51, t. 72.
Lobelia rupincola, Bertero ex Colla in Mem. Accad. Sc. Torino, xxxviii. p. 120.

JUAN FERNANDEZ.—Humid places in English Bay—*Bertero.*

Common in Australia, also occurring in New Zealand, South Africa, and extratropical South America. Perhaps casually introduced into Juan Fernandez, as it is in no other collection.

Lobelia tupa, Linn.

Lobelia tupa, Linn., Sp. Pl., ed. 2, p. 1318; Bertero in Ann. Sc. Nat., xxi. p. 347.
Tupa feuillei, G. Don, Gen. Syst., iii. p. 700; DC., Prodr., vii. p. 391; Gay, Fl. Chil., iv. p. 328; Bot. Mag., t. 2550; Bot. Reg., t. 1612.
Rapuntium spicatum vulgo tupa, Feuillée, Journal des Observations, ii. p. 739, t. 29.

JUAN FERNANDEZ. *Douglas; Moseley.*

This very conspicuous plant does not figure in Philippi's list of Juan Fernandez plants, doubtless from an oversight; for Bertero (op. sup. cit.) states that it was very common, as it is also in Chili and some parts of Peru.

Wahlenbergia fernandeziana, A. DC. (Plate LVI., figs. 1–4.)

Wahlenbergia fernandeziana, A. DC., Monogr. Camp., p. 160; Prodr., vii. p. 438; Gay, Fl. Chil., iv. p. 339.
Wahlenbergia larrainii, Bertero ex Colla in Mem. Accad. Sc. Torino, xxxviii. p. 118, t. 35 (reprint, p. 4).
Campanula larrainii, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In pastures and rocky situations—*Bertero; Scouler; Douglas; Mrs Graham.*

In Kew Herbarium there is a specimen of this plant received from the Paris Herbarium, labelled "Chili, M. Cl. Gay," but as there are no other continental specimens of this common Juan Fernandez species, it may be regarded as from Chili only, in the sense that the island belongs to that country.

Wahlenbergia grahamæ, Hemsl., n. sp. (Plate LVI., figs. 5, 10.)

Species aff. *Wahlenbergiæ fernandezianæ* a qua differt habitu robustiore foliis ovatis vel leviter cordato-ovatis minute denticulatis puberulis, floribus majoribus, corollæ lobis latioribus, &c.

JUAN FERNANDEZ.—Endemic. *Mrs Graham*, 1823; *Moseley*.

Mrs Graham's specimen of this previously undescribed species of *Wahlenbergia* was on a sheet with specimens of *Wahlenbergia fernandeziana*, from which it is easily distinguishable at a glance, as Miss Smith's drawing shows. Mr Moseley collected one sprig of the same species, which is in no other collection that we have seen.

Wahlenbergia tuberosa, Hook. f.

Wahlenbergia tuberosa, Hook. f., Bot. Mag., t. 6155.
Euphorbia masafueræ, Philippi in Bot. Zeit., 1856, p. 647, et in Cat. Pl. Vasc. Chil., p. 264.

MASAFUERA.—Endemic. *Leyboldt; Downton*.

It is remarkable that no other botanist or traveller who has investigated the flora of the island has collected this very distinct species, which was discovered in 1873 by Mr Downton, who introduced living plants for Messrs Veitch of Chelsea, where it flowered in 1874. Probably the slender flowering stems are of short duration, and the tuberous root-stock inconspicuous, hence the reason of its being overlooked. Leyboldt's specimen wants flowers.

Wahlenbergia berteroi, Hook. et Arn.

Wahlenbergia berteroi, Hook. et Arn. in Hook. Journ. Bot. i. (1834), p. 279, t. 137; DC., Prodr., vii p. 438; Gay, Fl. Chil., iv. p. 340.
Campanula gracilis, var. Colla in Mem. Accad. Sc. Torino, xxxviii. p. 119 (reprint, p. 5).

JUAN FERNANDEZ.—Endemic. In crevices of rocks in the higher mountains, and in Goat Island—*Bertero*.

Of this species we have only seen the one piece figured in the work cited above.

ERICACEÆ.

Pernettya rigida, DC.

Pernettya rigida, DC., Prodr., vii. p. 587; Philippi in Cat. Pl. Vasc. Chil., p. 194.
Arbutus rigida, Bertero ex Colla in Mem. Accad. Sc. Torino, xxxviii. p. 120 (reprint, p. 6), t. 36.
Gaultheria mucronata, Hook. et Arn. in Hook. Journ. Bot., i. (1834), p. 281, partim.
Gaultheria mucronata, β *mutica*, Hook. et Arn., l. c.
Pernettya racemulosa, DC., Prodr., vii. p. 588.
Pernettya bridgesii, Philippi in Bot. Zeit., 1856, p. 646, et in Cat. Pl. Vasc. Chil., p. 194.

JUAN FERNANDEZ.—Thickets in the hills and mountains—*Bertero; Scouler; Douglas; Mrs Graham; Reed; Moseley; Downton*. MASAFUERA.—*Leyboldt*.

The genus *Pernettya* comprises about fifteen species, whereof one (or two ?) inhabit the mountains of Tasmania and New Zealand, and the rest South America, including the Falkland Islands. In America the species range from Fuegia northward through the Andes to Mexico. *Pernettya rigida* is closely allied to *Pernettya mucronata*, one of the commoner species in the extreme south of America.

PRIMULACEÆ.

Centunculus pentandrus, R. Br.

Centunculus pentandrus, R. Br., Prodr. Fl. Nov. Holl., i. p. 47.
Micropyxis pumila, Duby in DC. Prodr., viii. p. 72.
Anagallis ovalis, Ruiz et Pav., Fl. Peruv. et Chil., ii. p. 8, t. 115; Philippi in Bot. Zeit., 1856, p. 629.
Anagallis pumila, Swartz, Fl. Ind. Occ., i. p. 345.

JUAN FERNANDEZ. *Philippi.*

A small annual plant now widely dispersed in Central and South America, the West Indies, Africa, East Indies, and Australia.

POLEMONIACEÆ.

Collomia gracilis, Douglas.

Collomia gracilis, Douglas in Bot. Reg., sub. t. 1622; DC., Prodr., ix. 308 (cum β *andicola*, Benth.); Philippi in Bot. Zeit., 1856, p. 629; Bot. Calif., i. p. 488; Gay, Fl. Chil., iv. p. 422.
Gilia gracilis, Hook., Bot. Mag., t. 2924.

JUAN FERNANDEZ. *Philippi.*

British Columbia and the Rocky Mountains to California, and common in Chili. An annual, probably an introduced plant in Juan Fernandez.

BORAGINEÆ.

Selkirkia, Hemsl.

Calyx parvus, alte 5-fidus, lobis ovatis obtusiusculus sub fructu occultis. Corollæ subrotatæ tubus brevis, sursum parum dilatatus, fauce gibbis vel plicis 5 convexis semicircularibus instructa; limbi lobi 5, imbricati, patentes, rotundati, undulati. Stamina 5, tubo affixa, inclusa vel subexserta, filamentis brevibus; antheræ oblongæ, obtusæ. Ovarii lobi 4, indistincti, jam tuberculati; stylus erectus, inclusus, stigmate capitato. Ovula angulo interno affixa, suberecta. Nuculæ 4, vel abortu pauciores, facie interna areola triangulari ad apicem gynobasi pyramidatæ affixæ, late alatæ, deorsum præcipue valde productæ, margine cristato-dentatæ, dorso tuberculis sæpius 3 vel 4 crassis elongatis rectis vel leviter, curvatis apice hispidulis instructæ. Semina in loculis deorsum productis pendula.

Selkirkia berteroi, Hemsl. (Plate LVII.)

Selkirkia berteroi, Hemsl.
Cynoglossum berterii, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 132, t. 43, mala; DC., Prodr. x. p. 153.

Frutex ramosus, 3–6 pedalibus, foliis lanceolatis confertis vix hispidulis, floribus albidis late cymoso-corymbosis.

JUAN FERNANDEZ. — Endemic. Declivities in the mountain woods of the higher regions—*Bertero; Reed; Downton; Moseley.*

At the date when Colla named this plant, the genus *Cynoglossum* was a most comprehensive one; yet he remarks that in habit it deviates widely from all its congeners; but ripe fruit was unknown to him. Independently of the shrubby habit, the flowers and fruit afford distinctive characters of generic value, as we think. It is named after Alexander Selkirk, who certainly deserves this kind of distinction as much as Defoe's imaginary hero, to whom De Candolle dedicated the Juan Fernandez genus *Robinsonia*.

In the present plant the normal scabridity of the Borragineæ is reduced to a minimum, and the inflorescence is altogether different from that of *Cynoglossum*. There are no scales in the throat of the corolla, but these are replaced by semicircular inflexions of the substance of the tube itself, which are concave without and convex within. The young ovules are suberect in the coarsely tuberculed lobes of the ovary, but from the whole downward extension of the cell cavity the seeds become pendulous in fact, if not in theory. The nutlets, of which sometimes only three grow out to maturity, are attached all along the inner surface to a pyramidal axis, and they are broadly winged and irregularly toothed, the wing being much extended below, thus concealing the small calyx, while the back is furnished with usually three or four coarse tubercules.

CONVOLVULACEÆ.

Calystegia tuguriorum, R. Br.

Calystegia tuguriorum, R. Br., Prodr. Fl. Nov. Holl., p. 483 in obvers.; Hook. f., Fl. N. Zeal., i. p. 183, t. 47.
Convolvulus tuguriorum, Forst., Fl. Ins. Austr. Prodr., p. 14; Hook. f., Handb. Fl. N. Zeal., p. 198.

MASAFUERA. *Downton.*

New Zealand; Chatham Islands; Chiloe and Valdivia.

Until we found the record (in the Handbook of the New Zealand Flora) of this plant from South America, we were under the impression that it was restricted to New Zealand. The Masafuera plant is exactly like New Zealand specimens; and although there are no South American specimens in Kew Herbarium bearing this name, there can be little doubt that the author of the New Zealand Flora referred to a specimen collected in Chiloe by Captain King, and another in Valdivia: the latter may be different.

SOLANACEÆ.

Solanum tuberosum, Linn.

Solanum tuberosum, Linn., Sp. Pl., ed 1, p. 185; DC., Prodr., xiii. 1, p. 31; Philippi in Bot. Zeit., 1856, p. 630; Gay, Fl. Chil., v. p. 74.

JUAN FERNANDEZ. *Philippi.*

The potato is included here on the authority of Philippi, who says nothing about its distribution in the island, where it is doubtless a colonist.

Solanum fernandezianum, Philippi.

Solanum fernandezianum, Philippi in Linnæa, xxix. p. 23; Baker in Journ. Linn. Soc. Lond., xx. p. 490.

JUAN FERNANDEZ.—Endemic? Shady woods on the higher mountains—*Bertero; Reed; Moseley.*

Philippi had seen no tubers when he described the species; but Bertero's label bears the following memorandum: *tubercula gustu amaro.* Mr Baker thinks this may be only a variety of *Solanum tuberosum*, and it is certainly very closely allied to that species.

Solanum furcatum, Dunal.

Solanum furcatum, Dunal in DC. Prodr., xiii. 1, p. 51; Philippi in Bot. Zeit., 1856, p. 629.

JUAN FERNANDEZ. *Philippi.*

For this species also Philippi is the sole authority. It is very closely allied to *Solanum nigrum*, if anything more than a form of that species, and is most likely an introduced plant in Juan Fernandez. It was founded upon Peruvian specimens.

Physalis pubescens, Linn.

Physalis pubescens, Linn., Sp. Pl., ed. 1, p. 183; DC., Prodr., xiii. 1, p. 446; Gay, Fl. Chil., v. p. 62

JUAN FERNANDEZ. *Philippi.*

A very widely dispersed plant in cultivated and waste ground, probably of recent introduction into the island.

Cestrum parqui, L'Herit.

Cestrum parqui, L'Herit., Stirp. Nov., i. p. 73, t. 36; Gay, Fl. Chil., v. p. 95; Bot. Mag., t. 1770; Bertero in Ann. Sc. Nat., xxi. p. 350.

JUAN FERNANDEZ. *Scouler; Moseley.*

Common in Chili, Peru, and some parts of Brazil, Uruguay, &c. It is not included in Philippi's list, nor is it in the set of Bertero's plants at Kew; but Scouler collected it in

the island in 1828, five years before Bertero's visit. Bertero (l. c.) states, however, that it was common in the vicinity of houses; but, like many other plants believed to possess medicinal virtues, it was imported from Chili.

Nicotiana cordifolia, Philippi.

Nicotiana cordifolia, Philippi in Bot. Zeit., 1856, p. 646.

Masafuera.—Endemic. *Philippi.*

Philippi describes this as a shrubby species allied to *Nicotiana solanifolia*, a Chilian species which we have not seen.

SCROPHULARINEÆ.

Mimulus parviflorus, Lindl.

Mimulus parviflorus, Lindl., Bot. Reg., t. 874; DC., Prodr., x. p. 371; Gay, Fl. Chil., v. p. 141; Philippi in Bot. Zeit., 1856, p. 629.

Juan Fernandez.—Introduced? *Philippi.*

A common Chilian species, included in Philippi's list of Juan Fernandez plants without any remarks.

VERBENACEÆ.

Rhaphithamnus longiflorus, Miers.

Rhaphithamnus longiflorus, Miers in Trans. Linn. Soc. Lond., xxvii. p. 98.
Citharexylum venustum, Philippi in Bot. Zeit., 1856, p. 646.

Juan Fernandez.—Endemic. Woods in the hills—*Bertero*, 1498, in part; *Mrs Graham; Scouler; Douglas; Moseley; Downton.* Masafuera.—*Reed.*

Apparently one of the commoner indigenous plants in the island. Mrs Graham notes that it is a large tree; Douglas says "a small shrub," and Philippi describes it as a small tree. It is, or was called "Arrayan macho" or "espinillo."

The genus comprises about half a dozen closely allied species, four of which inhabit the mainland of Chili. The following, of which the flowers are unknown, is most likely only a barren state of *Rhaphithamnus longiflorus.*

Rhaphithamnus serratifolius, Miers.

Rhaphithamnus serratifolius, Miers in Trans. Linn. Soc. Lond., xxvii. p. 99.

Juan Fernandez.—Endemic. In the higher mountains—*Bertero*, 1498, in part; *Reed.*

LABIATÆ.

Cuminia brevidens, Benth.

Cuminia brevidens, Benth. in DC. Prodr., xii. p. 258; Gay, Fl. Chil., iv. p. 510.

JUAN FERNANDEZ.—Endemic. In mountain woods—*Bertero*, 1490, in part; *Reed*; *Philippi*.

Cuminia is a shrubby or subarboreous genus restricted to the island of Juan Fernandez.

Cuminia eriantha, Benth. (Plate LVIII.)

Cuminia eriantha, Benth. in DC. Prodr., xii. p. 258; Gay, Fl. Chil., iv. p. 511.
Bystropogon erianthus, Benth., Labiatæ, Suppl., p. 727.

JUAN FERNANDEZ. — Endemic. In the hills—*Mrs Graham*; *Gay*; *Moseley*; *Downton*.

The plant collected by Downton and figured in this work is, in some of its characters, intermediate between typical *Cuminia fernandezia* and *Cuminia eriantha*, and which, perhaps, should rank only as varieties of one species. There is only one specimen in the Kew Herbarium of *Cuminia fernandezia*, and that is perfectly glabrous, except the corolla and a line of short white hairs on each side across the nodes from petiole to petiole. Further, the leaves are narrower, with a cuneate base; the inflorescence is looser, and the peduncles and pedicels are very slender. Typical *Cuminia eriantha* has pubescent branches, leaves (under surface chiefly), inflorescence, and flowers, including the calyx; and the inflorescence is denser, with relatively short, stout peduncle and pedicels. Downton's plant is altogether less hairy, and the calyx is quite glabrous, while the inflorescence is nearly as loose as that of *Cuminia fernandezia*.

The flowers of all the species of *Cuminia* are dimorphic and functionally unisexual; the two forms often occurring in the same inflorescence, though the male flowers are much more numerous than the females in all the specimens examined. Some of the specimens bear, or rather bore, for they are all fallen, male flowers only, which, soon after they have discharged their pollen, disarticulate close under the calyx. As represented in the accompanying figure of *Cuminia eriantha*, the corolla of the male flowers is considerably larger, the shorter style does not reach the anthers, and only rudimentary ovules were found. The female flowers contain rudimentary stamens, some of them with and some of them without anthers, and always (?) destitute of pollen. Possibly the flowers are sometimes polygamously monœcious.

Cuminia fernandezia, Colla.

Cuminia fernandezia, Colla in Mem. Accad. Sc. Torino, xxxviii. p. 139 (reprint, p. 25), t. 47; DC., Prodr., xii. p. 258; Gay, Fl. Chil., iv. p. 510.

JUAN FERNANDEZ.—Endemic. In mountain woods—*Bertero*, 1490, in part.

Not in any of the recent collections.

PLANTAGINEÆ.

Plantago fernandeziana, Bertero.

Plantago fernandeziana, Bertero ex Barnéoud, Monogr. Plantag., p. 47; DC., Prodr., xiii. 1, p. 704; Gay, Fl. Chil., v. p. 202.

Robinsonia? nervosa, Philippi in Bot. Zeit., 1856, p. 645, et Cat. Pl. Vasc. Chil., p. 176.

JUAN FERNANDEZ.—Endemic. Rocky places in the higher mountains near Portezuelo—*Bertero; Germain.*

A very striking species, with a stem from three to six feet high.

INCOMPLETÆ.

CHENOPODIACEÆ.

Roubieva multifida, Moq.

Roubieva multifida, Moq. in Ann. Sc. Nat., sér. 2, i. p. 292, t. 10, fig. B., et in DC. Prodr., xiii. 2, p. 80.

Ambrina pinnatisecta, Spach, Veg. Phanerog., v. p. 296.

Chenopodium multifidum, Linn., Sp. Pl., ed. 1, p. 220.

Blitum tenue, Moq. in DC. Prodr., xiii. 2, p. 81; Gay, Fl. Chil., v. p. 238.

Chenopodium tenue, Colla in Mem. Accad. Sc. Torino, xxxix. p. 9, t. 50.

Ambrina tenuis, Moq., Chenop. Enum., p. 42.

JUAN FERNANDEZ.—In stony places—*Bertero.*

A common plant in Chili and other parts of South America, as well as in more distant regions. It is in none of the more recent collections, and is probably a colonist of casual occurrence in the island. There is no doubt that Colla's *Chenopodium tenue* is this plant, and just the ordinary form; Bertero himself mistook it for the Paico or Payco, *Chenopodium ambrosioides*, Linn., a similar plant, now widely dispersed, and eaten as a vegetable in South America.

Salicornia peruviana, H. B. K.

Salicornia peruviana, H. B. K., Nov. Gen. et Sp., ii. p. 193; Gay, Fl. Chil., v. p. 245; DC., Prodr., xiii. 2, p. 145.

JUAN FERNANDEZ.—In stony brackish places near El Puente—*Bertero.* MASAFUERA.—*Germain.*

Apparently the same species that is common on the western coast of South America, and perhaps only a form of a species having a much wider range of distribution; but this point can only be settled by a thorough investigation of the genus.

[Bertero (Ann. Sc. Nat., xxi. p. 348) mentions a shrubby species of *Atriplex* as growing in Goat Island. It is the number 105 of Colla's Plantæ Rariores (Mem. Accad. Sc. Torino, xxxix. p. 8), who describes the stems and leaves, but gives it no name beyond *Atriplex?* Bertero noted on his label "Caulis frutescens 3-4 pedalis, flores haud vidi."]

POLYGONACEÆ.

Rumex acetosella, Linn.

Rumex acetosella, Linn., Sp. Pl., ed. 1, p. 338; Gay, Fl. Chil., v. p. 279; Philippi in Bot. Zeit., 1856, p. 629; Benth., Fl. Austr., v. p. 265.

JUAN FERNANDEZ.—Introduced. *Philippi; Moseley.*

A native of Temperate Europe and Asia, now naturalised in North America, and in many parts of the southern hemisphere, including Chili, where it is common.

PIPERACEÆ.

Lactoris fernandezia, Philippi. (Plate LIX.)

Lactoris fernandeziana, Philippi in Verhandl. d. k. k. zool.-bot. Gesellsch. Wien, Abhandl., xv. p. 521, t. 13; Benth. et Hook., Gen. Pl., iii. p. 127.

Ansonia nodulosa, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In moist shady woods in the higher mountains—*Bertero; Reed; Moseley; Downton.*

One of the most remarkable plants of the island, differing from all other members of the order in its inflorescence and in having a perianth. Reed says the smell and taste are "peppery." We find the flowers polygamously monœcious.

Peperomia fernandeziana, Miq.

Peperomia fernandeziana, Miq., Syst. Pip., p. 139; Gay, Fl. Chil., v. p. 378; DC., Prodr., xvi. 1, p. 445.

JUAN FERNANDEZ.—Endemic. Shady woods in the higher mountains—*Bertero;* hills to the west of Cumberland Bay, at 1800 feet above the sea—*Reed.*

Also found in Valdivia and other parts of Chili, and recorded by C. de Candolle (Prodromus, xvi. 1, p. 445) from Pinchincha and Wahoo, but these localities may belong to some other species, like the figure in Wight's Icones cited in the same place.

Peperomia berteroana, Miq.

Peperomia berteroana, Miq., Syst. Pip., p. 114, et Ill. Pip., p. 17, t. 11; DC., Prodr., xvi. 1, p. 414; Gay, Fl. Chil., v. p. 377.

JUAN FERNANDEZ.—Endemic. Rocky places in the higher mountains—*Bertero; Reed; Moseley.*

Peperomia margaritifera, Bertero.

Peperomia margaritifera, Bertero ex Hook., Ic. Pl., i. t. 91; DC., Prodr., xvi. 1, p. 439; Miq., Syst. Pip., p. 112, et Ill. Pip., p. 16, t. 10; Gay, Fl. Chil., v. p. 376.

JUAN FERNANDEZ.—Endemic. On shady declivities of the higher mountains—*Bertero*, 1493.

A remarkable species not collected by recent travellers.

SANTALACEÆ.

Santalum.

JUAN FERNANDEZ.

Sandalwood of some kind formerly abounded in the island, as we learn from the narratives of the early voyagers, and from the dead trunks of the tree existing as recently as 1856. Gay names the Juan Fernandez sandalwood *Santalum album*, without doubt, but it seems very uncertain whether it belongs to this genus even; for, although it is Polynesian (including the Sandwich Islands), it is not represented in America. See paragraph thereon in the introductory notes to this part, p. 11.

LORANTHACEÆ.

Loranthus berteroi, Hook. et Arn.

Loranthus berteroi, Hook. et Arn. in Hook. Bot. Misc. (1833), iii. p. 357; Walp., Repert. Bot. Syst., ii. p. 445.
Loranthus venetus, Bert. MSS., non H. B. K.
Loranthus tetrandrus, Philippi in Bot. Zeit., 1856, p. 628, non Ruiz et Pavon.

JUAN FERNANDEZ.—Endemic. Parasitic on *Myrtus fernandeziana*—*Bertero.*

We have only seen Bertero's specimen, which is a good one, and evidently distinct from *Loranthus tetraphyllus*. Of course the latter may also occur in the island; yet as Philippi has only one species, there is some justification for assuming that it is *Loranthus berteroi*.

EUPHORBIACEÆ.

Dysopsis gayana, Baill.

Dysopsis gayana, Baill., Etude Général des Euphorbiacées, p. 436.
Molina chilensis, Gay, Fl. Chil., v. p. 346, et Atl., t. 62.
Mirabellia glechomoides, Bertero MSS. cited in Steudel's Nomencl. Bot., and also by Baillon.
Bowlesia crenata, Desv. ex DC., Prodr., iv. p. 70.
Hydrocotyle glechomoides, Rich., Monogr. Hydrocot., n. 14, t. 58, fig. 17.
Dysopsis glechomoides, *a hirsuta*, Müll., Arg. in DC. Prodr., xv. 1, p. 949.

JUAN FERNANDEZ.—Humid shady places in the mountain woods—*Bertero; Reed; Moseley.*

In Ecuador, and very common in Valdivia and Chiloe; also in Fuegia.

Müller (l. c.) defines two other varieties; the insular form differing from them mainly in being clothed with longer hairs.

URTICACEÆ.

Urtica masafueræ, Philippi.

Urtica masafueræ, Philippi in Bot. Zeit., 1856, p. 647; Wedd. in DC. Prodr., xvi. 1, p. 42.

MASAFUERA.—Endemic? *Germain.*

A very distinct and elegant little plant; but Weddell (l. c.) says: "Huc referenda sunt, ni fallor, specimina quædam a beato Hilario in sylvis umbrosis prope Montevideo lecta et in herb. mus. Par. servata. Hæc olim pro varietatibus *Urticæ magellanicæ* habui, et non erit mirandum si aliquando, iterum scrutata, ad eamdam sententiam redirent botanici. Planta montevidensis multo elatior est quam masafuerensis foliisque majoribus donata, serraturis seu crenis obtusis utrinque 4–6."

Urtica glomerulæflora, Steud.

Urtica glomerulæflora, Steud. in Flora (1850), xxxiii. p. 257; DC., Prodr., xvi. 1, p. 57; Blume, Mus. Bot. Lugd.-Bat., ii. p. 154; Wedd., Monogr., p. 94.
Boehmeria fernandeziana, Gay, Fl. Chil., v. p. 360.

JUAN FERNANDEZ.—Endemic. In the mountain woods—*Bertero.*

Moseley collected an *Urtica*, without lateral branchlets, in which the spherical clusters of flowers are distinctly pedunculate, otherwise there are no prominent characters to distinguish it from the present.

Boehmeria excelsa, Wedd.

Boehmeria excelsa, Wedd. in Ann. Sc. Nat., sér. 4, i. p. 202, Monogr. Urt., p. 352, et in DC. Prodr., xvi. 1, p. 200.
Procris excelsa, Steud. in Flora (1850), xxxiii. p. 261.
Splitgerbera denudata, Gay, Fl. Chil., v. p. 362.
Urtica excelsa, Bertero MSS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. In shady woods along the mountain streams—*Bertero; Cuming; Reed; Moseley.*

Bertero states (Ann. Sc. Nat., xxi. p. 347) that this is a tree ten to twenty feet high, called "Manzano" by the natives.

Parietaria debilis, G. Forst.

Parietaria debilis, G. Forst., Fl. Ins. Aust. Prodr., n. 387; Wedd. in DC. Prodr., xvi. i. p. 235[45] (varietates *α micrantha* et *β gracilis*).
Freirea erecta, Philippi, Fl. Atacam., p. 49.
Freirea fernandeziana, Steud., Nomencl. Bot.
Urtica fernandeziana, Steud. in Flora (1850), xxxiii. p. 259.

JUAN FERNANDEZ. *Bertero; Reed; Moseley.*

A very widely dispersed plant, often occurring only as a weed of cultivation or an escape therefrom.

MONOCOTYLEDONES.

BROMELIACEÆ.

Ochagavia elegans, Philippi.

Ochagavia elegans, Philippi in Bot. Zeit., 1856, p. 647.

JUAN FERNANDEZ.—Endemic. *Germain.*

From the description this must be a very pretty and distinct little plant, with rosy flowers and silvery leaves about four inches long. We have seen no specimen of it; but in Kew Herbarium there are leaves of a Bromeliaceous plant, probably a *Tillandsia* collected by Bertero in shady woods in the very highest part of the mountains. They are narrow, and about eighteen inches long. Bertero himself (Ann. Sc. Nat., xxi. p. 348) states that a *Tillandsia*, or a species of some closely allied genus, was met with on the highest mountains, and a *Bromelia*, near *Bromelia discolor*, was very common on dry elevated rocks in the mountains. The former was probably the *Ochagavia elegans* of Philippi.

IRIDEÆ.

Libertia formosa, Graham.

Libertia formosa, Graham in Edinb. New Philos. Journ., Oct. 1833, p. 383; Bot. Reg., t. 1630; Bot. Mag., t. 3294; Gay, Fl. Chil., vi. p. 30.
Libertia crassa, Graham, l. c.?
Libertia grandiflora, Philippi in Bot. Zeit., 1856, p. 648, non Sweet.

JUAN FERNANDEZ. *Mrs Graham; Bertero; Cuming; Reed; Moseley.* MASAFUERA. *Germain; Downton.*

Valdivia and Chiloe, and southward.

Apparently one of the commoner plants of the islands. Philippi regards the insular plant as specifically different from the Chilian, but some of the specimens from the mainland are as big and robust as those from Juan Fernandez. Should it prove to be really different, Graham's name *crassa* may perhaps stand for it, but we have seen no authentically named specimen of that. Philippi's name is occupied by a New Zealand plant. Mr Downton, who collected in Juan Fernandez, introduced the plant into England for Messrs Veitch, with whom it flowered in 1876. The cultivated plant was about three feet high, with leaves nearly as long as the flower-stem, and the expanded flower was an inch and a quarter across.

PALMÆ.

Juania australis, Drude.

Juania australis, Drude ex Hook. f. in Append. Rep. Progr. and Cond., Roy. Gard., Kew, 1884, p. 57.
Ceroxylon? australe, Mart., Hist. Nat. Palm., iii. p. 315.
Morenia chonta, Philippi in Bot. Zeit., 1856, pp. 648 et 818.

JUAN FERNANDEZ.—Endemic. Dense woods on the mountains—*Bertero; Germain.*

"Chonta" is the native name of this Palm, which is peculiar to Juan Fernandez. According to Germain, as recorded by Philippi (l.c.), it is diœcious, and the trunk attains a height of eighty to ninety feet. It is stated in Sutcliffe's Crusoniana, p. 28, that the Cabbage Palm or Chonta was abundant during Alexander Selkirk's stay on the island (1704–1709); but in Walter's account of Commodore Anson's visit, as quoted by Sutcliffe, p. 67, the number of trees in 1741 was small, and most of them were growing on precipices and in dangerous situations. Moseley states[1] that from a certain point in the island one could count the number of trees remaining.

Philippi (Bot. Zeit., 1856, p. 634) describes the Chonta as a very slender and graceful Palm; the trunk, though rarely exceeding eight inches in diameter, rises high above the tallest forest trees, where its head of waving feathery leaves is very effective. The dark green trunk is quite smooth and shining, and the leaf-scars are about eight inches asunder. The scarlet fruit is about the size of a bullet, and hangs in elegant festoons, adding greatly to the beauty of the tree.

JUNCACEÆ.

Juncus microcephalus, H. B. K.

Juncus microcephalus, H. B. K., Nov. Gen. et Sp., i. p. 237; Gay, Fl. Chil., vi. p. 141; Buchenau in Abhandl. naturw. Vereins, Bremen, vi. p. 406.

JUAN FERNANDEZ.—In humid pastures—*Bertero; Scouler; Douglas; Reed; Moseley.*

A common and variable American species, ranging from Mexico to Uruguay and Chili.

Juncus acutus, Linn.

Juncus acutus, Linn., Sp. Pl., ed. 1, p. 325; Gay, Fl. Chil., vi. p. 140; Buchenau in Abhandl. naturw. Vereins, Bremen, iv. p. 421, et vi. p. 389.
Juncus macrocarpus, Nees in Linnæa, xx. p. 243.

JUAN FERNANDEZ. *Scouler.*

A maritime species inhabiting the coast of western and southern Europe, from the south of England; North and South Africa, and both sides of South America.

Juncus dombeyanus, J. Gay.

Juncus dombeyanus, J. Gay in Laharpe Monogr. Junc., p. 132; C. Gay, Fl. Chil., vi. p. 142; Buchenau in Abhandl. naturw. Vereins, Bremen, vi. p. 408; Philippi in Bot. Zeit., 1856, p. 630.

JUAN FERNANDEZ. *Germain.*

This is the only *Juncus* in Philippi's list; and it is also recorded from Juan Fernandez by Buchenau, but there are no authentically named specimens of this species at Kew. It is, however, evidently so near *Juncus microcephalus* as to be hardly separable as a species. It is also recorded from the southern provinces of Chili.

[1] Notes by a Naturalist on the Challenger, p. 541.

Juncus chamissonis. Kunth.

Juncus chamissonis, Kunth, Enum. Pl., iii. p. 348; Gay, Fl. Chil., vi. p. 145; Buchenau in Abhandl. naturw. Vereins, Bremen, vi. p. 379.
Juncus imbricatus, Laharpe, Monogr. Junc., p. 149, *pro parte*.

JUAN FERNANDEZ.—In hilly pastures; frequent—*Bertero; Reed; Moseley.*

Ecuador and Brazil, southward to Uruguay and Chili.[1]

CYPERACEÆ.

Cyperus reflexus, Vahl.

Cyperus reflexus, Vahl, Enum. Pl., ii. p. 299; Kunth, Enum. Pl., ii. p. 42; Bœckeler in Linnæa, xxxv. p. 558; Clarke in Journ. Linn. Soc. Lond., xxi. p. 116; Gay, Fl. Chil., vi. p. 166.
Cyperus fernandezianus, Colla in Mem. Accad. Sc. Torino, xxxix. p. 21, t. 56; Steud., Cyperaceæ, p. 8; Gay, l. c., p. 163.
Cyperus hæmatostachys, Steud., op. cit., p. 41.

JUAN FERNANDEZ.—In pastures—*Bertero; Scouler; Reed; Moseley.*

Brazil, Uruguay, and Chili.

Colla's plant is certainly this rather than *Cyperus vegetus*, which Gay says it resembles; in fact, Bertero's specimens in the Kew Herbarium agree very well with Colla's rude figure.

Cyperus vegetus, Willd.

Cyperus vegetus, Willd., Sp. Pl., i. p. 283; Kunth, Enum. Pl., ii. p. 40; Bœckeler in Linnæa, xxxv. p. 550; Gay, Fl. Chil., p. 167.

JUAN FERNANDEZ.—In wet pastures—*Bertero; Scouler; Moseley.* MASAFUERA.—*Germain.*

Also a native of Chili and Brazil.

Cyperus sp.

JUAN FERNANDEZ. *Scouler.*

Two specimens in a very young state—too young for identification, but apparently allied to *Cyperus brachystachys*, Hook. f., from the Galapagos Islands.

Scirpus nodosus, Rottb.

Scirpus nodosus, Rottb., Descr. et Ic. Pl., p. 52, t. 8, fig. 3; Benth., Fl. Austr., vii. p. 231.
Isolepsis nodosa, R. Br., Prodr. Fl. Nov. Holl., p. 221; Kunth, Enum. Pl., ii. p. 199; Rich., Fl. Nouv. Zél., t. 18; Gay, Fl. Chil., vi. p. 185.

JUAN FERNANDEZ. *Moseley.*

[1] Mr W. Mitten sends cultivated specimens of a *Juncus* "raised from seeds shaken out of Juan Fernandez mosses." It is a very slender form of *Juncus effusus*, Linn., or a closely allied species. Dr Buchenau, to whom an imperfect specimen was sent, suggests that it may be *Juncus pauciflorus*, R. Br., a common Australian species; but, in the absence of more complete specimens, the species is indeterminable.

This plant inhabits Chili, South Africa, Australia, New Zealand, New Caledonia, St. Paul Island, and St Helena, being the commonest Glumifera in the last-named island. We have only seen it from Juan Fernandez in Mr Moseley's collection, without any information concerning the locality.

Cladium scirpoideum, Benth. et Hook. f. (Plate LX.)

Cladium scirpoideum, Benth. et Hook. f., Gen. Pl., iii. p. 1066.
Terobera scirpoidea, Steud., Cyperaceæ, p. 164.
Agylla ensifolia, Philippi in Anales Univ. Chili, 1865, i. p. 643, et in Cat. Pl. Vasc. Chil., p. 302.
Vincentia scirpoidea, Bœckeler in Linnæa, xxxviii. p. 250, *partim*.

JUAN FERNANDEZ.—By the side of the stream in swampy ground, covering a considerable area—*Moseley; Reed.*

Of this very remarkable plant, we have seen no specimens in the older collections, therefore it is probably local in its occurrence. Steudel cites Bertero's No. 1509 for this plant, a number apparently not represented in Kew Herbarium. *Terobera* is an anagram of Bertero. Bœckeler (l. c.) has confused a Brazilian species with this. The two plants bear a strong general resemblance to each other, both in foliage and inflorescence, but, as the analyses of the flowers in our Plate show, they are quite distinct. The Brazilian species may be named *Cladium ficticium*, Hemsley. There are no ripe nuts of either species, but the spikelets afford characters by which they are easily recognised. In *Cladium scirpoideum* the spikelets are looser, and the longer glumes are produced at the tip into long awn-like points, while in *Cladium ficticium* they are broader, and the flowering ones scarcely acute. The habitat of the latter is uncertain; none of the Kew set of Glaziou's plants are localised, and some labelled Province of Rio are clearly not from that province. Moseley collected only leaves of *Cladium scirpoideum*, the longest of which are about four feet.

Uncinia douglasii, Boott.

Uncinia douglasii, Boott in Hook. f. Fl. Antarct., p. 369; Clarke in Journ. Linn. Soc. Lond., xx. p. 401; Gay, Fl. Chil., vi. p. 228.

JUAN FERNANDEZ. *Douglas; Reed; Moseley.* MASAFUERA. *Leyboldt.*

A distinct species, apparently restricted to these islands.

Carex paleata, Boott.

Carex paleata, Boott in Trans. Linn. Soc. Lond., xx. p. 127, et Illustr. Gen. Carex, t. 116; Gay, Fl. Chil. vi. p. 219.

JUAN FERNANDEZ.—Endemic. *Scouler; Cuming*, 1341; *Reed; Moseley.* MASAFUERA. *Germain.*

GRAMINEÆ.

Paspalum distichum, Linn.

Paspalum distichum, Linn.?, Sp. Pl., ed. 2, i. p. 82; Kunth, Enum. Pl., i. p. 52; Benth., Fl. Austr., vii. p. 461.
Paspalum vaginatum, Swartz, Fl. Ind. Occ., i. p. 135; Desvaux in Gay Fl. Chil., vi. p. 239.
Paspalum fernandezianum, Colla in Mem. Accad. Sc. Torino, xxxix. p. 26, t. 59; Steud., Gramineæ, p. 32.
Paspalum chepica, Steud., l. c., p. 21.

Juan Fernandez.—In hill pastures, frequent—*Bertero.*

Very widely dispersed in warm countries, including Chili.

The Juan Fernandez plant is remarkable for its hairiness, which, though exaggerated in Colla's figure, is very prominent. Desvaux (l. c.) doubtingly referred *Paspalum fernandezianum* to *Paspalum vaginatum*, and the late General Munro absolutely referred it to *Paspalum distichum* in Kew Herbarium, merely distinguishing it as "*varietas foliis hirsutis.*" The latter botanist is followed here in the reduction of *Paspalum vaginatum* to *Paspalum distichum*. Although Bertero signalises it as frequent on his label, this grass is not in any of the recent collections.

Phalaris intermedia, Bosc.

Phalaris intermedia, Bosc in Poiret (Lamarck) Encycl. Suppl., i. p. 300; Chapm., Fl. Southern U.S., p. 569.
Phalaris microstachya, DC., Cat. Monsp., p. 131; Kunth, Enum. Pl., i. p. 32; Gay, Fl. Chil., vi. p. 255; Trin., Ic. Gram., t. 77.
Phalaris angusta, Nees, Agrostogr. Brasil., p. 391; Trin., Ic. Gram., t. 78.
Phalaris robinsoniana, Ness MSS. ex Steud. Gramineæ, p. 11.
Phalaris chilensis, Presl, Reliq. Hænk. i. p. 245.
Phalaris americana, Ell., Sketch Bot. N. Carol., i. p. 101.

Juan Fernandez. *Cuming; Reed; Germain.*

A very common grass in many parts of America from Carolina to Chili. The synonymy given above is based upon the late General Munro's notes in the Kew Herbarium, but it is probably incomplete.

Anthoxanthum odoratum, Linn.

Anthoxanthum odoratum, Linn., Sp. Pl., ed. 1, p. 28; Kunth, Enum. Pl., i. p. 38; Benth., Fl. Austr., vii. p. 557; Hook. f., Handb. Fl. N. Zeal., p. 321.

Juan Fernandez and Masafuera. *Reed.*

This grass colonises freely, and is now very common in many countries in the southern hemisphere, even in remote localities in New Zealand as well as in islands like the present; but there are good grounds for the opinion that it is of northern origin. In the Kew Herbarium there is a specimen which is three feet long, from Diana's Peak, St Helena.

Stipa (Stephanantha) fernandeziana, Philippi.

Stipa (*Stephanantha*) *fernandeziana*, Philippi, Descr. Nuevas Plantas, 1873, p. 84, non Steud.

JUAN FERNANDEZ.—Endemic. *Philippi.*

There are no specimens at Kew agreeing with Philippi's description, according to which the leaves are hairy and the awn "*basi valde pilosa.*"

Stipa bicolor, Vahl.

Stipa bicolor, Vahl, Symb., ii. p. 24; Cav., Ic. Pl., v. t. 466; Kunth, Enum. Pl., i. p. 181; Gay, Fl. Chil., vi. p. 287.
Stipa neesiana, γ *fernandeziana*, Trin.; Munro MSS. in Herb. Kew.
Stipa fernandeziana, Steud., Gramineæ, p. 124, non Philippi.

JUAN FERNANDEZ. *Douglas; Cuming; Reed.*

Not uncommon in extratropical South America.

On the label attached to Douglas's specimen in the Kew Herbarium it is noted that this grass grows from six to seven feet high in Juan Fernandez. There is some confusion of the synonymy of *Stipa bicolor* and *Piptochætium bicolor*, Desv., which has arisen doubtless in consequence of the strong general resemblance of the two plants. Desvaux cites *Stipa bicolor*, Vahl non Trin. et Rupr., as a synonym of his plant, while Munro makes it a true *Stipa*. Philippi includes *Stipa manicata*, Desv., in his list, and Desvaux himself queries this as being the same as *Stipa bicolor*, Cav.

Piptochætium bicolor, Desv.

Piptochætium bicolor, Desv. in Gay Fl. Chil., vi. p. 273.
Urachne (*Piptochætium*) *stipoides*, Trin.; Munro MSS. in Herb. Kew.

JUAN FERNANDEZ. *Reed; Moseley.*

This is also a native of Mendoza and Monte Video, and perhaps also of some parts of Brazil. It is placed in *Oryzopsis*, as that genus is limited by Bentham and Hooker; but as no name for it exists under that genus, and the synonymy is involved, we leave it to be dealt with by some future monographer.

Polypogon crinitus, Trin.

Polypogon crinitus, Trin., Gram. uni- et sesquifl., p. 171; Steud., Gramineæ, p. 183; Gay, Fl. Chil., vi. p. 297.
Polypogon australis, Brongn. in Duperry's Voyage, Bot. Phanerog., p. 21.

JUAN FERNANDEZ.—In wet pastures, and by ditches—*Bertero; Scouler.*

Many critical species of this genus have been proposed that cannot be regarded as of higher rank than accidental forms of *Polypogon monspeliensis* and other widely naturalised species, and this seems to be one of them.

Nowodworskya imberbis, Philippi.

Nowodworskya imberbis, Philippi, Descr. Nuevas Plantas, 1873, p. 86.

JUAN FERNANDEZ. *Philippi.*

There is nothing in the collections examined answering to Philippi's description. *Nowodworskya* is incorporated with *Polypogon* by Bentham and Hooker.

Chætotropis chilensis, Kunth.

Chætotropis chilensis, Kunth, Rev. Gram., i. p. 271, t. 47, et Enum. Pl., i. p. 231; Gay, Fl. Chil., vi. p. 303.
Polypogon chætotropis, Trin.; Steud., Gramineæ, p. 134.
Chætotropis latifolia, Philippi in Linnæa, xxx. p. 205.

JUAN FERNANDEZ.—In wet pastures—*Bertero; Scouler; Cuming; Douglas.*

Also in Chili, but apparently rare, for in the Kew Herbarium there is only Philippi's *Chætotropis latifolia*, certainly from the mainland; a specimen labelled "Chili, Gay," may be from Juan Fernandez, as some of his plants thus labelled are known to be; yet the original *Chætotropis chilensis* is recorded from "Concepcion Islands" by Kunth and D'Urville. Gay merely repeats this record without any remarks of his own. Philippi's proposed new species from Ilque, near Puerto Montt, does not seem to deserve the rank even of a variety, for the leaves of the Juan Fernandez specimens vary from two to six lines in width; and the inflorescence of Douglas's specimens, which were "four to six feet high," is from eight to ten inches in length.

Aira caryophyllea, Linn.

Aira caryophyllea, Linn., Sp. Pl., ed. 1, p. 66; Kunth, Enum. Pl., i. p. 289; Benth., Fl. Austr., vii. p. 585; Gay, Fl. Chil., vi. p. 333.

JUAN FERNANDEZ. *Moseley; Reed.* MASAFUERA. *Germain.*

A native of Europe and the Mediterranean region, now naturalised in many other countries. In the work cited above Mr Bentham says of this, "generally distributed over the area of the genus," without stating whether he considers it indigenous in Australia or not, though of *Aira præcox* he says, "probably introduced only into Australia."

Aira præcox, Linn.

Aira præcox, Linn., Sp. Pl., ed. i, p. 65; Kunth, Enum. Pl., i. p. 289; Benth., Fl. Austr., vii. p. 585.

JUAN FERNANDEZ. *Moseley.*

Doubtless introduced here as well as in America, and in all southern countries where it exists.

Trisetum (Koeleria) laxum, Philippi.

Trisetum (Koeleria) laxum, Philippi, Descr. Nuevas Plantas, 1873, p. 92.

JUAN FERNANDEZ. *Philippi.*

There is no authentically named specimen of this plant in the collections examined, and none that agrees with the description.

Trisetum variabile, Desv.

Trisetum variabile, Desv. in Gay Fl. Chil., vi. p. 351; Philippi in Bot. Zeit., 1856, p. 630.
Trisetum malacophyllum, Steud., Graminea, p. 229.

JUAN FERNANDEZ. *Philippi; Moseley.*

Founded by Desvaux on Chilian specimens, with the remark that it is sufficiently near *Trisetum subspicatum*—"Esta planta es bastante vecina del *Trisetum subspicatum.*" In the Kew Herbarium there is a specimen from Juan Fernandez collected, or at least communicated by Reed, and named *Trisetum chromostachyum*, Desv.? var. *vaginatum*.

Steudel cites Bertero's No. 998 for his *Trisetum malacophyllum*, and Desvaux the same number for his *Trisetum variabile*, so it may be assumed that they represent the same plant. Indeed, there is little doubt that these and several other proposed South American species belong to the generally diffused *Trisetum subspicatum*, Beauv.

Pantathera fernandeziana, Philippi. (Plate LXI.)

Pantathera fernandeziana, Philippi in Bot. Zeit., 1856, p. 649; Benth. et Hook., Gen. Pl., iii. p. 1200.

JUAN FERNANDEZ.—In woods of the higher mountains—*Bertero; Douglas; Reed; Philippi; Moseley.* MASAFUERA.—*Germain.*

This remarkable grass is restricted to the islands, where, however, it would appear to abound, for it is in nearly all the collections; yet we find no description of it earlier than Philippi's in 1856. But as Bertero collected it the probabilities of its being somewhere described are great, especially as it is a large grass of distinct aspect. The specimens vary in length from about fifteen inches with the root, to two feet and a half without the root, and judging from the latter, the culms sometimes reach as much as three feet in length; but they are slender, and probably more or less procumbent. Among the numerous specimens in the Kew Herbarium, it was difficult to find perfect flowers and grain, as they are eaten by some insect, though fortunately those collected by Moseley furnish both flowers and mature grain for the accompanying plate. Philippi mentions that his specimens were in the same condition, and he was unable to describe either stamens or pistil. The outer glumes have been described as three-nerved, but they are really five-nerved, the two lateral nerves on each side being confluent from the base upwards to the middle of the glume or even higher; and the very coriaceous flowering glume is also five-nerved, though inconspicuously. The spikelets are much laterally compressed, and the glumes consequently

strongly keeled, and the long awns spread and curve downwards only with age. Curiously enough, the ovary in all the flowers examined bore three distinct styles; this was so in flowers from different spikelets from the same specimen. In a quite young state the ovary is glabrous, and the ripe caryopsis also; but some unfertilised misshapen ovaries of intermediate age were found, which were a little hairy about the upper part. No trace was seen of the hairy appendage characteristic of the genus *Bromus*. The ripe caryopsis is about three lines long, free from the glume and pale, though very closely invested by them. We have found nothing at all like this grass from the mainland, and it differs even more from the ordinary *Bromus* than the somewhat anomalous species of *Agrostis*, endemic in the Tristan da Cunha group and St Paul Island, do from the normal *Agrostis*.

Podophorus bromoides, Philippi. (Plate LXII.)

Podophorus bromoides, Philippi in Bot. Zeit., 1856, p. 649; Benth. et Hook., Gen. Pl., iii. p. 1200.

Juan Fernandez.—Endemic—*Philippi*.

Of this curious grass we have seen only one specimen, sent to Kew by Philippi himself in 1861. The prolongation of the rhachilla beyond the single floret of the spikelet, is a striking characteristic of the genus; the same thing occurs in the otherwise very different *Gymnopogon*.

Bromus unioloides, H. B. K.

Bromus unioloides, H. B. K., Nov. Gen. et Sp., i. p. 151; Kunth, Enum. Pl., i. p. 415; Gay, Fl. Chil., vi. p. 438.
Bromus hænkeanus, Kunth, Enum. Pl., i. p. 416.
Bromus stamineus, Desvaux in Gay Fl. Chil., vi. p. 440?
Bromus catharticus, Vahl, Symb., ii. p. 22?
Ceratochloa unioloides, DC., Cat. Hort. Monsp., p. 92; Benth., Fl. Austr., vii. p. 662.
Bromus schraderi, Kunth, Enum. Pl., i. p. 416.

Juan Fernandez. *Cuming; Philippi.*

Philippi sent his specimen named *Bromus catharticus*, Vahl (*Bromus stamineus*, Desv.)

A very common American grass, ranging from British Columbia southward to Patagonia; commonly cultivated under various names, and now naturalised in many other countries.

Bromus cebadilla, Steud.

Bromus cebadilla, Steud., Gramineæ, p. 321.

Juan Fernandez. *Bertero.*

Also in Chili, according to Steudel, who cites the numbers 117, 118, 861, and 1411 of Bertero's collection. The name is not included in Philippi's list, neither is it taken up in Walper's Annales, and the sixth volume of Gay's Flora Chilena, which contains the grasses, was published two years before Steudel's Gramineæ. Desvaux, who elaborated

the grasses for Gay's work, cites Bertero's No. 117 under his *Bromus stamineus*, while the other numbers do not appear to be cited at all, at least not under the genus *Bromus* or *Festuca*, where one would expect to find them. Steudel does not give any reason for using the specific name he has given this plant, but the inference is that it is the popular name, yet it is not among those given in the last volume of Gay's Flora. It may be a diminutive of *cebada*, barley, grain; though on turning to a dictionary the only English equivalent of *cebadilla* given is "powder of hellebore"! We suspect this is one of the forms of the common *Bromus unioloides*. *Cebadilla* is the name in Central America of the fruits of *Schœnocaulon officinale*, A. Gray, a Melanthaceous plant.

Hordeum nodosum, Linn.

Hordeum nodosum, Linn., Sp. Pl., ed. 1, p. 126; Benth., Fl. Austr., vii. p. 669.
Hordeum pratense, Hudson, Fl. Anglica, ed. 2, p. 56; Kunth, Enum. Pl., i. p. 455.
Hordeum secalinum, Schreber, Spic., p. 148; Gay, Fl. Chil., vi. p. 458 (var. *chilense?*).
Hordeum pusillum, Nutt., Gen. N. Am. Pl., i. p. 87.

JUAN FERNANDEZ. *Cuming; Philippi.*

The variety of this widely spread plant found in Juan Fernandez has a very slender inflorescence, and is quite like one found in Mendoza, Buenos Ayres, and Uruguay. Mr Moseley collected *Hordeum murinum*, Linn., in the island.

Chusquea fernandeziana, Philippi.

Chusquea fernandeziana, Philippi, Descr. Nuevas Plantas, 1873, p. 101.
Chusquea ligulata, Munro in Trans. Linn. Soc. Lond., xxvi. p. 62, *partim*.
Arundo quila, Molina? Bertero MS. in Herb. Kew.

JUAN FERNANDEZ.—Endemic. Woods and thickets in the higher mountains—*Bertero; Reed; Moseley.*

The genus *Chusquea* is restricted to America and the West Indies, and comprises about thirty species, ranging from Mexico to Chili.

CRYPTOGAMÆ.—VASCULARES.

FILICES.

GLEICHENIACEÆ.

Gleichenia cryptocarpa, Hook.

Gleichenia cryptocarpa, Hook., Sp. Fil., i. p. 7, t. 6.
Gleichenia (Mertensia) cryptocarpa, Hook. and Bak., Synopsis Fil., p. 13.
Mertensia cryptocarpa, Gay, Fl. Chil., vi. p. 539; Philippi in Bot. Zeit., 1856, p. 631.

JUAN FERNANDEZ. *Philippi.*

A common Chilian species, occurring also to the southward, and in the Falkland Islands. The only evidence of this genus being represented in Juan Fernandez that we

have seen, is a small specimen of *Gleichenia revoluta*, H. B. K., collected by Mr Moseley—a species so distinct from the present that it is very unlikely Philippi can have been mistaken. It is remarkable as being the only vascular plant recorded from both Juan Fernandez and the Falklands.

Gleichenia revoluta, H. B. K.

Gleichenia revoluta, H. B. K., Nov. Gen. et Sp., i. p. 29; Hook., Sp. Fil., i. p. 7, t. 7.
Gleichenia (*Mertensia*) *revoluta*, Hook. and Bak., Synopsis Fil., p. 13.
Mertensia pruinosa, Mart., Ic. Crypt. Bras., p. 109.

Juan Fernandez. *Moseley; Downton.*

A common species in South America, ranging from New Grenada and Brazil to Chili and Chiloe.

POLYPODIACEÆ.

Thyrsopteris elegans, Kunze.

Thyrsopteris elegans, Kunze in Linnæa, ix. p. 506, et Farrnkräuter, p. 3, t. 1; Hook., Sp. Fil., i. p. 65; Hook. and Bak., Synopsis Fil., p. 16, t. 1, fig. 3; Gay, Fl. Chil., vi. p. 526.
Paniculatia berteri, Colla in Mem. Accad. Sc. Torino, xxxix. p. 35, t. 64.

Juan Fernandez.—Endemic. Moist shady woods in the higher mountains—*Bertero; Reed; Moseley; Downton.*

It is noteworthy that this very striking fern was not collected by any of the earlier travellers, whose collections are at Kew, except Bertero. A living plant of it exists at Kew.

Alsophila pruinata, Kaulf.

Alsophila pruinata, Kaulf.; Hook., Sp. Fil., i. p. 47; Mett., Fil. Hort. Bot. Lips., p. 110; Hook. and Bak., Synopsis Fil., p. 38; Gay, Fl. Chil., vi. p. 525.
Polypodium pruinatum, Swartz, Fl. Ind. Occ., iii. p. 1682.
Polypodium griseum, Schkuhr, Fil., t. 25.
Lophosoria affinis et *Lophosoria discolor*, Presl, die Gefässbündel im Stipes der Farrn, p. 37.
Trichosorus glaucescens et *frigidus*, Liebm., *fide* Hook. MSS.
Cyathea discolor, Bory in Duperr. Voyage, Bot. Crypt., p. 281.

Juan Fernandez.—Woods in the hills and mountains—*Bertero; Scouler; Philippi; Moseley; Downton.*

A very common American fern, ranging from Mexico and the West Indies to Chili and South Brazil. In Juan Fernandez, according to Bertero, the stem is from three to eight feet high.

Dicksonia berteroana, Hook.

Dicksonia berteroana, Hook., Sp. Fil., i. p. 67, t. 23; Gay, Fl. Chil., vi. p. 522; Hook. and Bak., Synopsis Fil., p. 51.
Davallia berteroana, Colla in Mem. Accad. Sc. Torino, xxxix. p. 37, t. 65.
Balantium berteroanum, Kunze, Anal. Pteridogr., p. 40.

JUAN FERNANDEZ.—Endemic. In dense woods of the higher mountains—*Bertero; Philippi; Reed; Moseley; Downton.*

Brackenridge (U. S. Expl. Exped., xvi. p. 277) referred a Fiji fern to this, which Mettenius afterwards described (Ann. Sci. Nat., sér. 4, xv. p. 81) as an independent species; hence the more extended geographical area given to *Dicksonia berteroana* in some works.

Hymenophyllum cruentum, Cav.

Hymenophyllum cruentum, Cav.; Hook., Sp. Fil., i. p. 87, t. 31; Hook. and Bak., Synopsis Fil., p. 56; Gay, Fl. Chil., vi. p. 527.
Hymenoglossum, Presl.

JUAN FERNANDEZ. *Reed; Philippi; Moseley; Downton.*

A very marked species, occurring in Chili and Patagonia.

Hymenophyllum dichotomum, Cav.

Hymenophyllum dichotomum, Cav., Præl., n. 688, ex Hook., Sp. Fil., i. p. 98, t. 36; Hook. and Bak., Synopsis Fil., p. 70; Gay, Fl. Chil., vi. p. 530.
Hymenophyllum nigricans, Colla in Mem. Accad. Sc. Torino, xxxix. p. 32, t. 62.
Hymenophyllum plicatum, Kaulf., Enum. Fil., p. 268.

JUAN FERNANDEZ.—On the roots of trees in shady woods of the higher mountains—*Bertero; Sainthill; Reed; Moseley.* MASAFUERA.—*Reed.*

Also in South Chili.

Hymenophyllum fuciforme, Swartz.

Hymenophyllum fuciforme, Swartz, Synopsis Fil., p. 148; Hook., Sp. Fil., i. p. 103, t. 36; Hook. and Bak., Synopsis Fil., p. 62; Gay, Fl. Chil., vi. p. 533.
Hymenophyllum fucoides, Cav., Præl., n. 686, non Swartz.
Hymenophyllum semiteres, Colla in Mem. Accad. Sc. Torino, xxxix. p. 32, t. 61.

JUAN FERNANDEZ.—On the trunks of trees in the mountain woods—*Bertero; Reed; Moseley; Downton.*

A very striking species, with fronds sometimes as much as three feet high. It also grows in Valdivia and in Chiloe, and somewhat recently it was found at Port Otway by Dr R. O. Cunningham of H.M.S. "Nassau."

Hymenophyllum polyanthos, Swartz.

Hymenophyllum polyanthos, Swartz, Synopsis Fil., p. 149; Hook., Sp. Fil., i. p. 106; Hook. and Bak., Synopsis Fil., p. 60; Hook. f., Handb. Fl. N. Zeal., p. 354; Gay, Fl. Chil., vi. p. 532.

JUAN FERNANDEZ. *Bertero; Reed; Moseley; Downton.*

This is very widely diffused in tropical and subtropical countries, and extends into some temperate regions; yet, though abundant in New Zealand, it has not hitherto been found in Australia, nor is it known to occur in South Africa.

Hymenophyllum rarum R. Br.

Hymenophyllum rarum, R. Br., Prodr. Fl. Nov. Holl., p. 159; Benth., Fl. Austr., vii. p. 705; Hook. f., Handb. Fl. N. Zeal., p. 353; Hook., Sp. Fil., i. p. 101; Hook. and Bak., Synopsis Fil., p. 58.
Hymenophyllum cuneatum, Kunze, Anal. Pteridogr., p. 50, et Farrnkräuter, p. 186, t. 78; Gay, Fl. Chil., vi. p. 535.
Hymenophyllum bivalve, Hook. and Grev., Ic. Fil., t. 83.

Juan Fernandez. *Philippi; Reed.*

This species inhabits Chili, New Zealand, the Auckland Islands, Tasmania, South Africa, and Mauritius.

Hymenophyllum reniforme, Hook.

Hymenophyllum reniforme, Hook., Sp. Fil., i. p. 110, t. 38; Hook. and Bak., Synopsis Fil., p. 59; Gay, Fl. Chil., vi. p. 534; Philippi in Bot. Zeit., 1856, p. 631 (errore *uniforme*).

Juan Fernandez. *Gay; Philippi.*

Of this very distinct species, the only specimens in Kew Herbarium are from Northern Peru and the Andes of Quito in Ecuador, hence there is some doubt about its being a native of Juan Fernandez. Philippi does not state whether he had seen specimens, or whether he copied Gay.

Hymenophyllum subtilissimum, Kunze.

Hymenophyllum subtilissimum, Kunze, Anal. Pteridogr., p. 50, et Farrnkräuter, p. 187; Hook. and Bak., Synopsis Fil., ed. 2, p. 64.
Hymenophyllum berteroi, Hook., Sp. Fil., i. p. 64, t. 33; Gay, Fl. Chil., vi. p. 534.
Hymenophyllum æruginosum β, Hook., Sp. Fil., i. p. 94, t. 34.
Hymenophyllum franklinianum, Colenso; Hook. and Bak., Synopsis Fil., ed. 1, p. 64.
Hymenophyllum ferrugineum, Colla in Mem. Accad. Sc. Torino, xxxix. p. 30.

Juan Fernandez.—On rocks and roots of trees in the shady woods of the higher mountains—*Bertero; Reed; Philippi; Moseley; Downton.*

Extratropical South America, and New Zealand.

In Hooker's Handbook of the Flora of New Zealand this is retained as a variety of *Hymenophyllum æruginosum*, Carm., a Tristan da Cunha plant, which is certainly very near it; but we have here followed the Synopsis Filicum. Plate XXXVIII. is a good representation of the Tristan da Cunha plant.

The inscription on Bertero's label with this species corresponds exactly to that cited by Colla under his *Hymenophyllum ferrugineum*, and as the description agrees as well, we have no hesitation in classing it with this.

Hymenophyllum tortuosum, Hook. and Grev.

Hymenophyllum tortuosum, Hook. and Grev., Ic. Fil., t. 129; Hook., Sp. Fil., i. p. 99 (excl. syn. *Hymenophyllum nigricans*, Colla); Hook. and Bak., Synopsis Fil., p. 70.

JUAN FERNANDEZ. *Reed; Philippi; Downton.*

A common species in extratropical South America.

Hymenophyllum tunbridgense, Smith.

Hymenophyllum tunbridgense, Smith, Fl. Brit., p. 1141; Hook., Sp. Fil., i. p. 95; Hook. and Bak., Synopsis Fil., p. 67; Gay, Fl. Chil., vi. p. 530; Philippi in Bot. Zeit., 1856, p. 631.

JUAN FERNANDEZ. *Gay; Philippi.*

There are no Juan Fernandez specimens of this fern in Kew Herbarium, but as it is the most universally dispersed species of the genus, it is not unlikely to occur. The form having entire involucral valves (*β wilsoni*, Hook. and Bak.) is common in Chili.

Trichomanes dichotomum, Philippi.

Trichomanes dichotomum, Philippi in Bot. Zeit., 1856, p. 650.

JUAN FERNANDEZ. *Philippi.*

In the collection of Chilian and Juan Fernandez plants in the Kew Herbarium, purchased by Mr Reed in 1873, there is a specimen of this fern labelled "Valdivia," in the handwriting apparently of Philippi, though in the place cited the latter records it from Juan Fernandez, therefore its native country is a little uncertain.

Trichomanes exsectum, Kunze.

Trichomanes exsectum, Kunze, Anal. Pteridogr., p. 47, t. 29, fig. 2; Hook., Sp. Fil., i. p. 141; Hook. and Bak., Synopsis Fil., p. 85; Gay, Fl. Chil., vi. p. 537 (errore *exsertum*).
Hymenophyllum fuciforme, Colla in Mem. Accad. Sc. Torino, xxxix. p. 33, t. 63, non Swartz.

JUAN FERNANDEZ. — On rocks in dark shady places in the mountains — *Bertero; Cuming; Moseley.* MASAFUERA.—*Reed.*

Also a native of the neighbourhood of Valdivia and Chiloe.

Following the indication on Bertero's label, Colla published this as *Hymenophyllum fuciforme* of Swartz, while to Swartz's plant he gave the name of *Hymenophyllum semiteres*. In each case there is no difficulty in determining the species, independently of the exact copies of Bertero's labels which Colla gives.

Trichomanes pyxidiferum, Linn.

Trichomanes pyxidiferum, Linn., Sp. Pl., ed. 2, p. 1561; Hook., Sp. Fil., i. p. 124; Hook. and Grev., Ic. Fil., t. 206; Hook. and Bak., Synopsis Fil., p. 81.

JUAN FERNANDEZ. *Moseley.*

Common in America, from Mexico southward to Chili; in Tropical and South Africa, and in India; also occurring in North-Eastern Australia.

Adiantum æthiopicum, Linn.

Adiantum æthiopicum, Linn., Sp. Pl., ed. 2, p. 1560; Hook., Sp. Fil., ii. p. 37, t. 77; Hook. and Bak., Synopsis Fil., p. 123.
Adiantum chilense, Kaulf., Enum. Fil., p. 207; Hook., Sp. Fil., ii. p. 43, t. 75; Gay, Fl. Chil., vi. p. 485.

Juan Fernandez. *Bertero; Scouler; Moseley.*

As limited in the Synopsis Filicum, this species includes a number of distinct forms, connected probably by intermediate ones, and it is generally diffused in warm countries. The form that has been called *Adiantum chilense* ranges from California to Chili. In Hooker's Species Filicum it is retained as an independent species.

Pteris comans, Forster.

Pteris comans, Forster, Fl. Ins. Austr. Prodr., p. 79; Swartz, Synopsis Fil., pp. 98 et 292; Benth., Fl. Austr., vii. p. 733.
Pteris (Litobrochia) comans, Hook., Sp. Fil., ii. p. 219; Hook. and Bak., Synopsis Fil., p. 171.
Pteris berteroana, Agardh, Sp. Pterid., p. 66; Hook., Sp. Fil., ii. p. 219.
Litobrochia comans, Presl, Tent. Pteridogr., p. 149.
Pteris endlicheriana, Agardh, Sp. Pterid., p. 66; Hook., Ic. Pl., t. 973.

Juan Fernandez.—In shady woods—*Bertero; Cuming; Moseley.*

A variable fern, the extreme forms of which have been described as species, but they are connected by intermediate stages, and some of the New Zealand specimens are indistinguishable from the Juan Fernandez plant. It inhabits New Zealand, Australia, and Polynesia, but hitherto it has not been found in America.

Pteris chilensis, Desv.

Pteris chilensis, Desv.; Hook., Sp. Fil., ii. p. 175, t. 120; Hook. and Bak., Synopsis Fil., p. 161; Gay, Fl. Chil., vi. p. 488.
Pteris tenera, Kaulf., Enum. Fil., p. 191; Colla in Mem. Accad. Sc. Torino, xxxix. p. 38.
Pteris fernandeziana, Philippi in Linnæa, xxix. p. 105.

Juan Fernandez.—Dense woods on the mountains—*Bertero; Cuming; Reed.*

Not uncommon in Chili.

Philippi's *Pteris fernandeziana*, of which there is an authentically named specimen at Kew, cannot be distinguished even as a variety.

Pteris incisa, Thunb.

Pteris incisa, Thunb., Prodr. Fl. Cap., p. 733; Hook., Sp. Fil., ii. p. 230; Hook. and Bak., Synopsis Fil., p. 172; Benth., Fl. Austr., vii. p. 732.
Litobrochia incisa et *Litobrochia vespertilionis*, Presl, Tent. Pteridogr., p. 149.
Pteris vespertilionis, Labill., Pl. Nov. Holl., ii. p. 96, t. 245.
Litobrochia appendiculata, Gay, Fl. Chil., vi. p. 491, non Kaulf.
Pteris flavescens, Colla in Mem. Accad. Sc. Torino, xxxix. p. 37.

Juan Fernandez.—In woods and along the banks of streams in the hills—*Bertero; Scouler; Douglas; Cuming; Reed; Moseley.*

Widely diffused in tropical and southern extratropical countries, and one of the commonest plants in Juan Fernandez.

[Gay, Fl. Chil., vi. pp. 490, 491, includes *Pteris patens*, Kunze (Anal. Pteridogr., p. 28), which is doubtless a form of *Pteris incisa*, Thunb., and *Litobrochia decurrens*, Presl, a well-marked species only known to us from Brazil.]

Pteris marattiæfolia, Hook.

Pteris marattiæfolia, Hook., Sp. Fil., ii. p. 177, t. 122; Hook. and Bak., Synopsis Fil., p. 157.
Pteris semiadnata, Philippi in Linnæa, xxix. p. 106.

Juan Fernandez. *Philippi.*

There are no specimens of this fern from Juan Fernandez at Kew, and it is probable that Philippi's record in the Linnæa was a mistake, for there is a specimen at Kew direct from him of his *Pteris semiadnata*, labelled "Valdivia." The other specimens are from Chiloe, Cordillera de la Costa, and Cordillera de Ranco. In the same place as the *Pteris*, Philippi published the very marked new *Trichomanes dichotoma*, and cited Juan Fernandez as its native country; but that also he sent to Kew labelled "Valdivia."

Lomaria attenuata, Willd.

Lomaria attenuata, Willd., Sp. Pl., v. p. 290; Hook., Sp. Fil., iii. p. 6; Hook. and Bak., Synopsis Fil., p. 176; Hook. f., Handb. Fl. N. Zeal., p. 368; Benth., Fl. Austr., vii. p. 736.
Blechnum attenuatum, Mett., Fil. Hort. Lips., p. 64, t. 3.
Lomaria fernandeziana, Philippi, Descr. Nuevas Plantas, 1873, p. 105.
Lomaria bella, Philippi in Linnæa, xxix. p. 104.
Lomaria acuminata, Philippi MSS. in Herb. Kew.
Lomaria schottii, Colla in Mem. Accad. Sc. Torino, xxxix. p. 44, t. 72.

Juan Fernandez.—In dense woods of the higher mountains—*Bertero; Douglas; Philippi; Reed; Moseley; Downton.*

Very widely diffused in tropical and southern extratropical countries; but within the limits of Hooker's Handbook of the New Zealand Flora, it is only known to occur in the Kermadec Islands, and only in Lord Howe Island within the limits of Bentham's Flora Australiensis. *Lomaria bella*, Philippi, is a pretty variety, with a deep red stipes and midrib.

Lomaria blechnoides, Bory.

Lomaria blechnoides, Bory in Duperr. Voyage, Bot. Crypt., p. 273; Hook., Sp. Fil., iii. p. 11; Hook. and Bak., Synopsis Fil., p. 177; Gay, Fl. Chil., vi. p. 481; Philippi in Bot. Zeit., 1856, p. 630.
Blechnum lomarioides, Mett., Fil. Lechl., p. 14.

Juan Fernandez. *Philippi; Reed.*

Philippi states that this species is common in Chili, but we have only seen it from the

province of Valdivia and Chiloe. Among Mr Reed's specimens from Juan Fernandez, is a very singular, stoloniferous variety on which the contiguous pinnules are twice as long as broad. Allied to the Australasian and Polynesian *Lomaria lanceolata*.

Lomaria lherminieri, Bory.

Lomaria lherminieri, Bory; Hook., Sp. Fil., iii. p. 9; Hook. and Bak., Synopsis Fil., p. 176; Hook.' Gard. Ferns, t. 40; Kunze, Farrnkräuter, p. 173, t. 73.
Lomaria lanceolata, Spreng.? Colla in Mem. Accad. Sc. Torino, xxxix. p. 45.
Blechnum lherminieri, Mett., Fil. Hort. Lips., p. 64, t. 4.

JUAN FERNANDEZ.—On the roots of trees on the hills—*Bertero; Moseley.*

This species ranges from the West Indies and New Grenada southward to Chili, and on the authority of Hooker and Baker, it scarcely differs from the Australian and Polynesian *Lomaria lanceolata*.

Lomaria alpina, Spreng.

Lomaria alpina, Spreng., Syst. Veg., iv. p. 62; Hook. and Bak., Synopsis Fil., p. 178; Hook., Sp. Fil., iii. p. 16.
Lomaria pennamarina, Mett.; Kuhn, Fil. Afr., p. 92; Baker in Mart. Fl. Bras. Polypod., fasc. xlix., p. 414.
Lomaria gayana, Fée in Gay Fl. Chil., vi. p. 481, et Fougères, 7ième Mém., p. 25, t. 10, fig. 1.
Blechnum parvulum, Philippi, Descr. Nuevas Plantas, 1873, p. 104.

JUAN FERNANDEZ. *Sainthill.*

Widely dispersed in south temperate regions, except South Africa. For more extended synonymy and further particulars of this species see the Report on the Botany of the Tristan da Cunha group in Part II., p. 164, of this Work.

Mr Sainthill's specimen, referred to this species by Mr Baker, answers quite well to Philippi's description of his *Blechnum parvulum*, and is apparently nothing more than an abnormal state of *Lomaria alpina*. Similar blechnoid conditions of *Lomaria* are not uncommon.

Lomaria boryana, Willd.

Lomaria boryana, Willd., Sp. Pl., v. p. 292; Hook. and Bak., Synopsis Fil., p. 180.
Lomaria magellanica, Desv. in Mém. Soc. Linn. Par., vi. p. 289; Hook., Sp. Fil., iii. p. 26; Hook. f., Fl. Antarct., p. 393; Gay, Fl. Chil., vi. p. 480.
Blechnum magellanicum, Mett., Fil. Lechl., p. 14.
Lomaria cycadifolia, Colla in Mem. Accad. Sc. Torino, xxxix. p. 43, t. 71.
Blechnum cycadifolium, Sturm, Enum. Fil. Chil., p. 23.
Lomaria lanuginosa, Kunze, Anal. Pteridogr., p. 19; Gay, Fl. Chil., vi. p. 479.

JUAN FERNANDEZ. In the mountain woods—*Bertero; Moseley; Downton.*

A very common fern in America, from the West Indies southward to the Strait of Magellan and the Falkland Islands; also common in South Africa, and occurring in

Tropical Africa, Madagascar, and Mauritius; and a very striking form that grows in the Tristan da Cunha group is referred to this species. It has not been found in Asia, Australia, or New Zealand.

Lomaria capensis, Willd.

Lomaria capensis, Willd., Sp. Pl., v. p. 291; Benth., Fl. Austr., vii. p. 737.
Osmunda capensis, Linn., Mant., p. 306.
Lomaria procera, Sprengel, Syst. Veg., iv. p. 65; Hook., Sp. Fil., iii. p. 22; Hook. and Bak., Synopsis Fil., p. 179; Hook., Ic. Pl., tt. 427, 428; Hook., Garden Ferns, t. 53.
Lomaria gilliesii, Hook. and Grev., Ic. Fil., t. 207.
Lomaria chilensis, Kaulf., Enum. Fil., p. 154; Gay, Fl. Chil., vi. p. 480.
Lomaria reedei, Philippi, Descr. Nuevas Plantas, 1873, p. 105?
Blechnum chilense, Mettenius, Fil. Lechl., p. 11.

JUAN FERNANDEZ. *Scouler; Moseley.*

Widely dispersed in tropical and southern extratropical countries, though it is wanting in St Helena, Tristan da Cunha, and other islands already dealt with in this work. On the other hand, it is abundant in New Zealand and the outlying Campbell and Kermadec Islands. We have doubtfully reduced Philippi's *Lomaria reedei* to this species from the description alone.

Blechnum australe, Linn.

Blechnum australe, Linn., Mant., p. 130; Hook., Sp. Fil., iii. p. 56; Hook. and Bak., Synopsis Fil., p. 186; Mett. in Reise der Novara, Bot., i. p. 208; Baker in Mart. Fl. Bras., fasc. xlix., p. 420.
Blechnum hastatum, Kaulf., Enum. Fil., p. 161; Hook., Sp. Fil., iii. p. 57; Hook. and Bak., Synopsis Fil., p. 185; Gay, Fl. Chil., vi. p. 477.
Lomaria hastata, Kunze, Farrnkräuter, p. 119, t. 55, fig. 1.
Blechnum pubescens, Hook., Ic. Pl., t. 97; Gay, Fl. Chil., vi. p. 478.
Lomaria pubescens, Kunze, Farrnkräuter, p. 122, t. 55, fig. 2.

JUAN FERNANDEZ.—Apparently very common in the islands, being in every collection from the early ones of Scouler and Bertero down to Moseley's, the last received.

This fern inhabits Madagascar, Bourbon, South Africa, the islands of St Paul, Amsterdam, and the Tristan da Cunha group, and is also common in temperate South America. In Hooker and Baker's Synopsis Filicum, *Blechnum hastatum* is retained as an independent species for the South American plant, but it is impossible to distinguish the African from it.

Asplenium lunulatum, Swartz.

Asplenium lunulatum, Swartz, Synopsis Fil., p. 80; Hook. and Bak., Synopsis Fil., p. 202.
Asplenium erectum, Bory in Willd. Sp. Pl., v. p. 328; Hook., Sp. Fil., iii. p. 126.
Asplenium fernandezianum, Kunze, Anal. Pteridogr., p. 22; Gay, Fl. Chil., vi. p. 503.
Asplenium alatum, Humb.? Colla in Mem. Accad. Sc. Torino, xxxix. p. 40, t. 69.

JUAN FERNANDEZ.—Shady woods in the higher mountains — *Bertero; Douglas; Cuming; Reed; Moseley; Downton.*

Almost universally spread in the tropics, and extending into some temperate regions, but absent from Australia and New Zealand. Among other oceanic islands it inhabits Ascension, St Helena, and Tristan da Cunha. The insular form is commonly proliferous.

Asplenium macrosorum, Bertero.

Asplenium macrosorum, Bertero; Colla in Mem. Accad. Sc. Torino, xxxix., p. 39, t. 67; Mett., Aspl., p. 126; Hook., Sp. Fil., iii. p. 93, t. 176; Hook. and Bak., Synopsis Fil., p. 206; Gay, Fl. Chil., vi. p. 500.

JUAN FERNANDEZ.—Endemic. On trunks of trees in the dense woods of the higher mountains—*Bertero; Philippi; Reed; Downton.*

This is one of the small number of ferns endemic in Juan Fernandez; it resembles the St Helena *Asplenium platybasis*, having fewer, larger, and more distinct sori.

Asplenium magellanicum, Kaulf.

Asplenium magellanicum, Kaulf., Enum. Fil., p. 175; Hook. and Grev., Ic. Fil., t. 180; Hook., Sp. Fil., iii. p. 177; Hook. and Bak., Synopsis Fil., p. 213; Gay, Fl. Chil., vi. p. 504.

JUAN FERNANDEZ.—On rocks along mountain streams—*Bertero; Reed; Moseley; Sainthill.* MASAFUERA.—*Cuming; Downton.*

From Tierra del Fuego northward to the Chilian Andes.

Asplenium obtusatum, Forst.

Asplenium obtusatum, Forst., Fl. Ins. Austr. Prodr., p. 80; Hook., Sp. Fil., iii. p. 96; Hook. and Bak., Synopsis Fil., p. 207; Benth., Fl. Austr., vii. p. 747; Hook., Fil. Exot., t. 46; Labill., Pl. Nov. Holl., ii. p. 93, t. 242; Hook. f., Handb. Fl. N. Zeal., p. 371.
Asplenium obliquum et *Asplenium lucidum*, Forst., Fl. Ins. Austr. Prodr., p. 80.
Asplenium chondrophyllum, Bertero, ex Colla in Mem. Accad. Sc. Torino, xxxix. p. 40, t. 68.
Asplenium consimile, Gay, Fl. Chil., vi. p. 501.

JUAN FERNANDEZ.—Maritime rocks at Pangual and English Bay—*Bertero; Reed.* MASAFUERA.—*Cuming.*

A native of Peru, Chili, Polynesia, Australia, New Zealand, the Crozets, Tristan da Cunha group, and the Sandwich Islands. Besides the Oceanic Islands named it also inhabits Easter Island, where Mr Sainthill collected it about the year 1867. In New Zealand it is exceedingly common, and presents a great range of variation.

Aspidium aculeatum, Swartz.

Aspidium aculeatum, Swartz, Synopsis Fil., p. 53; Baker in Mart. Fl. Bras., fasc. xlix., p. 462, t. 45.
Aspidium lobatum et *Aspidium vestitum*, Swartz, Synopsis Fil., pp. 53, 254; Gay, Fl. Chil., vi. p. 516.
Aspidium (*Polystichum*) *aculeatum*, Hook., Sp. Fil., iv. p. 18; Hook. and Bak., Synopsis Fil., p. 252.
Aspidium aculeatum, Swartz, var. *vestitum*, Hook. f., Handb. Fl. N. Zeal., p. 375.

JUAN FERNANDEZ.—Shady woods in the higher mountains—*Bertero; Scouler; Douglas; Cuming; Reed; Moseley; Downton.*

This is perhaps the commonest of all ferns, being spread over nearly the whole area of fern distribution; it is more general than *Pteris aquilina*, but unlike that it does not grow socially, covering large tracts. Yet, common as *Pteris aquilina* is, it is not found in any of our insular floras except that of the Bermudas.

Aspidium aculeatum presents an infinite variety of forms, from a few inches to several feet high, and equally diverse in the degree of cutting of the frond. The Juan Fernandez plant is a common southern form remarkable for the copious brown scales on the rachis.

Aspidium capense, Willd.

Aspidium capense, Willd., Sp. Pl., v. p. 267; Baker in Mart. Fl. Bras., fasc. xlix., p. 463, t. 29 (sub titulo *Swartziano*); Lowe, Fil., vi. t. 46.
Aspidium coriaceum, Swartz, Synopsis Fil., p. 57.
Aspidium (*Polystichum*) *coriaceum*, Hook., Sp. Fil., iv. p. 32.
Polystichum coriaceum, Gay, Fl. Chil., vi. p. 513; Philippi in Bot. Zeit., 1856, p. 631.

JUAN FERNANDEZ. *Scouler; Philippi.*

Generally spread in tropical and southern extratropical countries, including St Paul Island and Tristan da Cunha.

We have seen only one specimen from Juan Fernandez, and that was collected by Scouler in 1828.

Aspidium flexum, Kunze.

Aspidium flexum, Kunze, Anal. Pteridogr., p. 44.
Polystichum flexum, Gay, Fl. Chil., vi. p. 517.
Aspidium (*Polystichum*) *flexum*, Hook. and Bak., Synopsis Fil., p. 255.
Aspidium berterianum, Colla in Mem. Accad. Sc. Torino, xxxix. p. 42, t. 70; Hook., Sp. Fil., iv. p. 33 (*berteroanum*).

JUAN FERNANDEZ.—Endemic. On rocks and roots of trees in the mountain woods—*Bertero; Scouler; Cuming; Douglas; Reed; Moseley; Downton.*

Nephrodium (Lastrea) villosum, Hook.

Nephrodium (*Lastrea*) *villosum*, Hook., Sp. Fil., iv. p. 134, t. 264; Hook. and Bak., Synopsis Fil., p. 286.
Aspidium villosum, Swartz, Synopsis Fil., p. 56.
Polypodium (*Phegopteris*) *berteroanum*, Hook., Sp. Fil., iv. p. 269.

JUAN FERNANDEZ.—In shady woods—*Bertero; Douglas; Scouler; Reede; Philippi; Moseley.*

A very common fern in Peru and Chili, the indusium of which is commonly undeveloped, hence it has been partly referred to *Polypodium*. Philippi appears, from specimens in the Kew Herbarium named by him, to have mistaken the non-indusiate state for *Polypodium rugulosum*, a very distinct plant. *Nephrolepis altescandens* has a very fugacious indusium, and in consequence has also been referred to *Polypodium* by some authors.

Nephrolepis altescandens, Baker.

Nephrolepis altescandens, Baker in Hook. and Bak. Synopsis Fil., p. 301.
Polypodium altescandens, Colla in Mem. Accad. Sc. Torino, xxxix. p. 48; Hook., Sp. Fil., iv. p. 218.
Polypodium procurrens, Kunze, Anal. Pteridogr., p. 17; Gay, Fl. Chil., vi. p. 505.

JUAN FERNANDEZ. — Endemic. Climbing high on the trunks of trees — *Bertero; Philippi; Reed; Moseley.*

A near ally of *Nephrolepis ramosa*, which is widely spread in the warmer parts of the Old World.

Polypodium lanceolatum, Linn.

Polypodium lanceolatum, Linn., Sp. Pl., ed. 1, p. 1082; Hook. and Bak., Synopsis Fil., p. 356; Baker in Mart. Fl. Bras., fasc. xlix., p. 536, t. 32.
Polypodium peltatum, Cav.? Colla in Mem. Accad. Sc. Torino, xxxix. p. 52.
Polypodium (Phymatodes) lepidotum, Willd.; Hook., Sp. Fil., v. p. 56.
Pleopeltis ensifolia, Hook., Exot. Fl., t. 62.

JUAN FERNANDEZ.—Creeping over the trunks of trees—*Bertero; Reede; Philippi; Moseley.*

This is generally spread in tropical and subtropical South America, in tropical and South Africa; it also occurs in the Nilgherry Hills in India, in St Helena, and in the Sandwich Islands.

Polypodium punctatum, Thunb.

Polypodium punctatum, Thunb., Fl. Jap., p. 337; Hook. and Bak., Synopsis Fil., p. 312; Baker in Mart. Fl. Bras., fasc. xlix., p. 503.
Phegopteris rugulosa, Fée; Gay, Fl. Chil., vi. p. 507.
Polypodium rugulosum, Labill., Pl. Nov. Holl., ii. p. 92, t. 241.
Polypodium spectabile, Kaulf., Enum. Fil., p. 121.
Phegopteris spectabilis, Fée; Gay, Fl. Chil., vi. p. 507.

JUAN FERNANDEZ.—On the banks of streams in woods in the hills—*Bertero; Cuming.*

Widely spread in tropical and subtropical regions in both hemispheres, and extending into south temperate regions, though hitherto not found in New Zealand. It grows in the Tristan da Cunha group, as well as in St Helena.

Polypodium translucens, Kunze. (Plate LXIII.)

Polypodium translucens, Kunze, Anal. Pteridogr., p. 16.
Goniophlebium translucens, Fée; Gay, Fl. Chil., vi. p. 509.
Polypodium (Goniophlebium) translucens, Hook., Sp. Fil., v. p. 22; Hook. and Bak., Synopsis Fil., p. 342.
Polypodium intermedium, Colla in Mem. Accad. Sc. Torino, xxxix. p. 51, t. 74.
Polypodium californicum, Mett., Polyp., p. 71, non Kaulf.

JUAN FERNANDEZ.—Endemic—*Bertero; Douglas; Cuming; Reede; Moseley; Downton.*

From specimens collected by Mr Downton, and lately presented to the Kew Herbarium by Messrs Veitch, of Chelsea, this species is evidently very variable in the division of the fronds. The ordinary form, like the ordinary form of *Polypodium vulgare*, is simply pinnatifid; there is also a form corresponding to *Polypodium vulgare*, var. *cambricum*, and there are forms with bipinnatifid and almost tripinnatifid fronds, as represented in our Plate.

Polypodium masafueræ, Philippi.

Polypodium masafueræ, Philippi in Linnæa, xxix. p. 107.

MASAFUERA.—Endemic. *Philippi.*

Philippi compares this with a plant which he found on the shore of the Desert of Atacama, and which he proposed naming *Polypodium squamatum;* but that name is occupied by a Linnæan species. There is a specimen of the Atacama plant in the Kew Herbarium, and it is apparently a distinct species allied to *Polypodium plebeium.*

Gymnogramme (Selliguea) elongata, Hook.

Gymnogramme (Selliguea) elongata, Hook., Sp. Fil., v. p. 157; Hook. and Bak., Synopsis Fil., p. 387; Baker in Mart. Fl. Bras., fasc. xlix., p. 557.
Grammitis elongata, Swartz, Synop. Fil., p. 22.
Drynaria elongata, Fée, Gen. Fil., p. 271; Gay, Fl. Chil., vi. p. 512.
Synammia elongata, Presl, Tent. Pteridogr., p. 212.
Pleopeltis elongata, Kaulf., Enum. Fil., p. 246.
Polypodium elongatum, Mett., Polyp., p. 88.
Grammitis lanceolata, Schkuhr, Fil., p. 9, t. 7.

JUAN FERNANDEZ. *Gay.*

Cuba and Mexico to Brazil and Chili.

Although this is specially recorded in the Synopsis Filicum from Juan Fernandez, we have seen no specimen from the island in the Kew Herbarium, possibly because the sheet to which it was attached had been taken out for the purpose of attaching other specimens.

Nothochlæna chilensis, Hook.

Nothochlæna chilensis, Hook., Sp. Fil., v. p. 112, t. 286; Hook. and Bak., Synopsis Fil., p. 374.
Cincinnalis chilensis, Fée; Gay, Fl. Chil., vi. p. 497.

JUAN FERNANDEZ.—Endemic. On rocks in hot situations—*Bertero; Moseley.*

We have seen only one specimen of this plant, collected by Bertero, and two very stunted ones, by Moseley. It is closely allied to *Nothochlæna nivea*, a native of the Andes from Mexico to Peru.

CRYPTOGAMÆ.—CELLULARES.[1]

MUSCI.[2]

Oncophorus (Rhabdoweisia) cyathicarpus, Mitt.

Rhabdoweisia cyathicarpa, Mitt. in Journ. Linn. Soc. Lond., xii. p. 54.
Zygodon cyathicarpus, Montagne in Ann. Sc. Nat., ser. 3, iv. p. 106, Syll. Crypt., p. 37; Gay, Fl. Chil. Atl., t. 3, fig. 1; C. Müll., Synopsis Musc. Frond., i. p. 682.
Gymnostomum linearifolium, Tayl. in Hook. Lond. Journ. Bot., 1846, p. 42.

JUAN FERNANDEZ. *Moseley.*

Originally described from Chili, this moss has been gathered in the Andes of Quito by Jameson and Spruce, in the Bogotian Andes by Weir; in Africa it is found in the mountains of Abyssinia; in the Atlantic Islands it is the *Zygodon curvipes*, C. Müll., who describes it as dicœcious, but numerous Madeiran specimens are all moncœcious. Schimper named it "*Amphoridium canariense*." It is found also at the Cape of Good Hope, in Tasmania and Australia, and has thus a wider distribution in the southern hemisphere than *Oncophorus lapponicus*, the corresponding species of the northern regions. These mosses, together with the *Oncophorus mougeotii* and *Oncophorus californicus*, Hampe, of which *Amphoridium cæspitosum*, Mitt. (Journ. Linn. Soc. Lond., viii.), is probably a synonym, have been considered to be related to *Zygodon*, but their closest analogy is with the *Rhabdoweisiæ*, from which they simply differ in being nearly or quite destitute of a peristome.

Oncophorus (Rhabdoweisia) striatus, Mitt.

Oncophorus striatus, Lindb.; Braithw., Brit. Moss Fl., p. 172, t. 26.
Grimmia striata, Schrad., Bot. Journ., ii. p. 55.

JUAN FERNANDEZ. *Moseley.*

Intermixed with *Mielichhoferia*. It is probably cosmopolitan.

Dicranum billardieri, Schwägr.

Dicranum billardieri, Schwägr., Suppl., ii. p. 70, t. 121; C. Müll., Synopsis Musc. Frond., i. p. 368.
Dicranum truncorum, Schimp.; C. Müll. in Bot. Zeit., 1859, p. 215.

JUAN FERNANDEZ.—Without fruit—*Moseley*; in abundance in the same condition—*Mr W. Saunders' collector.*

It is present in most collections made in Chili and in Fuegia.

[1] See *ante*, p. 6 *et seq.*, for List of Cellular Cryptogams collected by Bertero.
[2] By William Mitten, Esq., A.L.S.

Campylopus (Thysanomitrium) leptodus, Mitt.

Campylopus leptodus, Montagne, Syll. Crypt., p. 43; Gay, Fl. Chil. Atl., vii. p. 174, t. 3, fig. 3.

Juan Fernandez. *Moseley.*

This well-marked species seems confined to the western side of South America, extending from the Quitinian Andes to South Chili; it also occurs in New Zealand and in the Auckland Islands.

Glyphomitrium fernandezianum, Mitt.

Glyphomitrium fernandezianum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 107.

Juan Fernandez.—In fruit, but the capsules mostly broken off—*Moseley.* It had before been gathered by Bertero and Cuming.

The genus is not yet well represented by specimens from the Chilian coasts.

Macromitrium saxatile, Mitt.

Macromitrium saxatile, Mitt. in Journ. Linn. Soc. Lond., xii. p. 200.

Juan Fernandez.—On rocks in shady places in the hills—*Bertero.*

Zygodon obovalis, Mitt., n. sp.

Dioicus, pusillus, folia patentia, oblongo-linearia, apice breviter acuminata acutave, nervo latiusculo infra apicem evanescente carinata, cellulis parvis rotundis obscuris parietibus latis pellucidis. Theca obovato plicata ore satis parvo peristomio ? ciliis 8.

Caulis 5–6 mm. altus. Folia ramea 1 mm.; comalia 1·50 mm. longa, luteo-viridia, sicca contorta. Seta 4 mm. longa. Theca cum collo vix 1 mm.

Juan Fernandez.—Amongst *Leptodon smithii—Mr W. Saunders' collector.*[1]

Similar to *Zygodon coralensis* and *Zygodon krausei*, Lorentz, from Valdivia, but different in its areolation of smaller cells, with wider interspaces, and with capsules in form like those of the European *Zygodon viridissimus.*

Funaria hygrometrica, Linn.

Funaria hygrometrica, Linn.; Hedw., Sp. Musc., p. 172; C. Müll., Synopsis Musc. Frond., i. p. 107.

Juan Fernandez.

Found in all parts of the world.

[1] A number of mosses and *Hepaticæ* were picked out of moss used to pack living plants sent by one of Mr W. Wilson Saunders' collectors from Juan Fernandez.—W. M.

Mielichhoferia longiseta, C. Müll.

Mielichhoferia longiseta, C. Müll., Synopsis Musc. Frond., i. p. 236 ; Mitt. in Journ. Linn. Soc. Lond., xii. p. 321.

Juan Fernandez. *Moseley.*

Andes of Peru and Ecuador, at altitudes of 10,000 to 11,000 feet.

Rhacopilum tomentosum, Brid.

Rhacopilum tomentosum, Brid., Bryol. Univ., ii. p. 719 ; Mitt. in Journ. Linn. Soc. Lond., xii. p. 333.
Hypnum tomentosum, Hedw., Musc. Frond., iv. p. 48, t. 19.
Hypopterygium tomentosum, C. Müll., Synopsis Musc. Frond., ii. p. 12.

Juan Fernandez.—In young fruit—*Moseley.* It was also gathered in abundance by Mr W. Saunders' collector, and lived for some years as a weed in Mr Mitten's garden on the earth under ferns, but did not fruit.

West Indies and Equinoctial America.

Lepidopilum splendidissimum, Mitt.

Lepidopilum splendidissimum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 378.
Hookeria splendidissima, Montagne in Ann. Sc. Nat., sér. 2, iv. p. 97 ; C. Müll., Synopsis Musc. Frond., ii. p. 203 ; Schwägr., Suppl., iv. t. 320.

Juan Fernandez. *Bertero ; Moseley.*

Also in Chili and Peru.

This beautiful moss Montagne distributed under the name of *Lamprophyllum splendidissimum*, but it does not appear that any notice was taken of this name in his printed works.

Pterygophyllum denticulatum, Mitt.

Pterygophyllum denticulatum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 397.
Hookeria dentata, Hook. f. et Wils. in Hook. Lond. Journ. Bot., iii. p. 550 ; Hook. f., Fl. Antarct., in t. 62, fig. 2 (*denticulata*) ; C. Müll., Synopsis Musc. Frond., ii. p. 203.

Juan Fernandez.—Small blackened barren stems amongst moss—*Mr W. Saunders' collector.*

Also in Hermite, Falkland, and Auckland Islands.

In the representation cited of this species, fig. 4 represents the leaf of the medial series ; fig. 3, the intermedial. The oblong lateral leaf is not shown. It is double the length of the others, as is usual in the species of this and many other *Hookeria*. *Pterygophyllum*

anomalum (Schwägr., t. 278, *Rhacopilum*), has its leaves undulate at the margin, and, like some others of the genus, revives in water with difficulty. There are several undescribed species of this genus from Chili.[1]

Porotrichum (Thamnium) confertum, Mitt., n. sp.

Frons e ramis crassis densifoliis confertus ; folia imbricata, patentia, ovata, acuta, nervo infra apicem evanido, margine in ramea apice denticulata, cellulis minutis oblongis densis.

Juan Fernandez.—A few stems all barren—*Moseley.*

Considerably different from *Porotrichum fasciculatum* in its branches not having the foliage compressed ; indeed, the whole look of the specimens is that of a greatly enlarged *Isothecium myurum.*

Porotrichum latinerve, Mitt., n. sp.

Folia in frondis medio erecto-patentia, subcompressa, lanceolata, apice latiuscule acuta, nervo lato ad apicem producto, margine subintegerrima ; ramea apice serrulata, nervo dorso dentato, cellulis parvis oblongis obscuriusculis areolata.

[1] *Pterygophyllum fragile*, Mitt., n. sp.—Caulis erectus ? apice arcuato-decurvus, simplex ; folia lateralia patenti-divergentia, obovato-spathulata, obtusa, ultra medium crasse nervata, margine dentibus approximatis ciliata, media intermediaque orbiculate ovata, e cellulis hexagonis areolata, fragilia, perichætialia parva, erecta, ovata, acuminata, convoluta ; theca in pedunculo elongato fusco oblonga, demum pendula, operculo rostrato, calyptra basi plurifida.

Caulis ? 2–3 cm. altus, simplex vel rarius divisus. Folia lateralia 3 mm. longa, 1·25 mm. lata, pellucida, fragillima, pallescentia. Pedunculus, 2 cm. longus, fuscus. Theca 2 cm. longa.—South Chili, Spencer and Reed.

There is also another smaller species from the same country.

Pterygophyllum sublimbatum, Mitt., n. sp.—Procumbens ; folia, lateralia, divergentia, oblonga, obovata, apice angulo lato acuta, ad medium nervata, media, intermediaque suborbiculata, omnia marginibus apicem versus denticulis brevibus serrata, paulo intensius fuscata, sublimbata.

Caulis ? 2–3 cm. longus, flaccidus. Folia 2 mm. longa, fusca, nigrescentia, cellulis parvis hexagonis areolata. Volcan d'Osorno, South Chili.

And a very different one from the Chonos Archipelago, gathered by Darwin, *Pterygophyllum chonoticum*, Mitt., n. sp.

Caulis ? erectus, apice arcuato decurvus ; folia lateralia patentia, oblongo-spathulata, obtusa, media, intermediaque suborbiculata, omnia media tenue nervata, margine apicem versus dentibus ciliata. Caulis 3–5 cm. altus, simplex vel innovationibus divisus. Folia lateralia 3 mm. longa, ubi latiora 1·50 mm. lata, pallide fulva fuscescentia ; folia media intermediaque 2 mm. longa, 1·50 mm. lata.

One of the most distinct of the genus, its spathulate lateral leaves giving it a similarity to some *Gottscheæ*, which is increased by the fulvous colour. All the species of this group of mosses are but little known. Some appear to grow in a procumbent manner, others erect, with the habit almost of a *Mnium*. In some species there are indications that the erect stems are really upright branches arising from a rhizome. The teeth of the peristome have the structure common to the *Hookeriæ*, the two external cells of which they are composed being separated by an interval along the medial line of division, so that each tooth has externally two bands of coloured cells resting on the margins of the colourless internal band, which is conspicuous through the median line.

JUAN FERNANDEZ. *Bertero;* with the preceding—*Moseley.*

Habit and size as in *Porotrichum fasciculatum* and *Porotrichum rigidum*, but in its leaves different from both.

Porotrichum (Thamnium) rigidum, Mitt.

Porotrichum (Thamnium) rigidum, Mitt. in Journ. Linn. Soc. Lond., xii. p. 467.

JUAN FERNANDEZ. *Bertero;* barren stems—*Moseley.*

It was gathered also by Mr Wilson Saunders' collector, amongst whose specimens there occurred a stem with one capsule, small for the size of the moss, of a shortly oval form, horizontal in position, on a penduncle 1 cm. long. The species in size is like *Porotrichum fasciculatum*, Swartz, but with no obtuse leaves. All these species are much larger than *Porotrichum valdiviæ*, or *Porotrichum panduræfolium*, C. Müll., from Chili.

Lepyrodon parvulus, Mitt.

Lepyrodon parvulus, Mitt. in Journ. Linn. Soc. Lond., xii. p. 422.

JUAN FERNANDEZ.—On bark with *Zygodon obovalis* and *Leptodon smithii*, barren—*Mr W. Saunders' collector.* MASAFUERA.—*Cuming.*

Also in Chili.

Leptodon smithii, Mohr.

Leptodon smithii, Mohr., Obs., p. 27; Mitt. in Journ. Linn. Soc. Lond., xii. p. 450.
Neckera smithii, C. Müll., Synopsis Musc. Frond., ii. p. 118.
Hypnum smithii, Dicks., Fasc. ii. Crypt., p. 10, t. 5, fig. 4.

JUAN FERNANDEZ.—On bark with *Zygodon obovalis* and *Lepyrodon parvulus*, barren—*Mr W. Saunders' collector.*

It is found in Chili, and extends to South Africa and New Zealand.

Stereodon lechleri, Mitt.

Stereodon lechleri, Mitt. in Journ. Linn. Soc. Lond., xii. p. 535.
Hypnum lechleri, C. Müll. in Bot. Zeit., 1856, p. 455.

JUAN FERNANDEZ. *Bertero; Moseley.*

Also found on the Chilian coasts. It differs from the *Stereodon chrysogaster*, C. Müll. *Hypnum portale*, Hook. f. et Wils., which is also found in Juan Fernandez and in New Zealand in about the same particulars as the smaller states of *Stereodon cupressiforme*, differ from those which are more robust, but in the case of *Stereodon lechleri* and *Stereodon chrysogaster*, it is size only that is the most obvious difference, the ramification and colour of the foliage being uniform in both.

Ptychomnion aciculare, Mitt.

Ptychomnion aciculare, Mitt. in Journ. Linn. Soc. Lond., xii. p. 536.
Hypnum aciculare, Bridel, Musc. Recen., ii. 2, p. 158, t. 5, fig. 2; C. Müll., Synopsis Musc. Frond., ii. p. 441.

JUAN FERNANDEZ. *Moseley.*

The specimens which have young fruit belong to that larger form of the species which is also found in South Chili and in the districts adjoining Magellan Strait, the stems and foliage are double the size of those structures found on the species in New Zealand and elsewhere, and it may possibly prove to be a distinct species. The ordinary state of *Ptychomnion aciculare* was gathered in Juan Fernandez by Bertero, and it grows also in Chili.

Hypnum (Rhynchostegium) tenuifolium, Hedw.

Hypnum (Rhynchostegium) tenuifolium, Hedw., Sp. Musc., p. 283, t. 75; Mitt. in Journ. Linn. Soc. Lond., xii. p. 552; C. Müll., Synopsis Musc. Frond., ii. p. 348.

JUAN FERNANDEZ.—Abundant specimens gathered by Mr Wilson Saunders' collector, but almost destitute of capsules.

This species is widely spread in the southern hemisphere.

Hypnum berteroanum, Mont.

Hypnum berteroanum, Mont. in Ann. Sci. Nat., sér. 3, iv. p. 89, et Syll. Crypt., p. 6; Gay, Fl. Chil., vi. p. 17; Mitt. in Journ. Linn. Soc. Lond., xii. p. 551.

JUAN FERNANDEZ. *Moseley.*

Collected in Chili by Bertero and Pœppig, but unknown from any other part of the world.

Hypnum toxarion, Schwägr.

Hypnum toxarion, Schwägr., Suppl., i. 2, p. 283; Müll., Synopsis Musc. Frond., ii. p. 446; Mitt. in Journ. Linn. Soc. Lond., xii. p. 557.

JUAN FERNANDEZ.—Collected by Douglas and Mr W. Saunders' collector; both specimens barren.

It seems to be abundant in Chili and Chiloe, where it has been gathered in fruit by Lechler, King, and Lobb.

Fissidens asplenoides, Hedw.

Fissidens asplenoides, Hedw., Musc. Frond., iii. p. 65, t. 28; C. Müll., Synopsis Musc. Frond., i. p. 69; Mitt. in Journ. Linn. Soc. Lond., xii. p. 591.

JUAN FERNANDEZ. *Bertero;* also among mosses gathered by Mr Wilson Saunders' collector.

This moss is widely diffused in the southern hemisphere, and in America it ranges from the West Indies to Chili.

HEPATICÆ.[1]

Plagiochila badia, Mitt., n. sp.

Caulis elongatus, parce ramosus; folia approximata, patentia, patulave ovato-oblonga, margine dorsali decurrente recurva, ventralique integerrima, apice breviter paucidentata.

Habitus staturaque *Plagiochilæ rubescentis*, Lindenb., t. xi., et foliorum ambitu similis, sed margine ventrali integerrima, apice dentibus brevissimis armata subintegerrima. Color nigro-fusca.

Juan Fernandez. *Mr W. Saunders' collector.*

At first sight the specimens of this species might readily be mistaken for *Plagiochila rubescens*, which has often the same dark colour; but the entire absence of the ciliiform teeth at once distinguishes it. Like *Plagiochila rubescens*, the foliage is scarcely altered in the dry state, and it is here and there glossy.

Plagiochila gayana, Gottsche.

Plagiochila gayana, Gottsche in Ann. Sci. Nat., sér. 4, viii. p. 322.

Juan Fernandez.—From the same source as the preceding.

A small-leaved species similar to *Plagiochila geniculata*, Lindenb., t. xxvii., in size and appearance, but quite distinct in the perianth, which is much compressed and with a small contracted truncate mouth, a form that is very rare in the genus. There is considerable variation in the dentation of the ventral margin of the leaf; on some stems the leaves are almost entire, slightly angulate; in other plants they are, as described by Gottsche, dentate all round the ventral side; the areolation is of small round cells with wide walls, the whole almost obscure. It is also very similar to *Plagiochila flexicaulis*, Mont., from Chili; but readily distinguished by the perianth.

Lophocolea sylvatica, Mitt., n. sp.

Prostrata; folia horizontaliter explanata, convexula, ovali-oblonga, apice sinu obtuso biangulata; amphigastria parva, quadridentata, utrinque cum foliis anguste confluentes; involucralia longiora, cum amphigastrio integerrimo apice bidentato basi coalita; perianthium triquetrum, labiis dentatis.

Caulis 1–2 cm. longus, hic illic radicosus cum foliis 2 mm. latus; amphigastria caulem vix latiora saepe recurva. Perianthium 1·50 mm. longum, angulis nudis.

Juan Fernandez.—Creeping amongst *Hypnum toxarion*—*Mr W. Saunders' collector.*

[1] By William Mitten, Esq., A.L.S.

A small species, in all the specimens of a brown colour, which may have been induced by their treatment as packing material; it is closely allied to a number of other South American species of about the same stature, but in the outline of the apices of its leaves, which is similar to that of *Lophocolea kürzii*, S. Lac., it agrees with none, and its perianth is without the winged angles so usual in them.

Chiloscyphus rotundifolius, Mitt., n. sp.

Prostratus, repens; folia explanata, suborbiculata, integerrima; amphigastria caulem parum latiora, bifida, laciniis extus inferne breviter unidentatis liberis; perianthium in ramo brevi laterale; foliis involucralibus oblongis, amphigastrio sub-ovato quadridentato oblongo trigono, labiis rotundatis breviter dentatis.

JUAN FERNANDEZ.—Creeping amongst mosses—*Mr W. Saunders' collector.*

A species in its size, and in the form and substance of its leaves and mode of growth, closely resembling the European *Chiloscyphus polyanthus*; but with its perianth and involucral leaves quite different.

Jungermannia oenops, Lindenb. et Gottsche.

Jungermannia oenops, Lindenb. et Gottsche in G. L. et N. Synopsis Hepat., p. 673.

JUAN FERNANDEZ. *Bertero; Moseley.* Small barren blackened specimens.

It closely resembles *Jungermannia colorata.*

Jungermannia fernandeziana, Mitt., n. sp.

Caulis satis crassus, elongatus, procumbens; folia semiverticalia, explanata vel sursum secunda, ovata, apice sinu parvo obtuso bidentata, cellulis rotundatis limitibus latiusculis pellucidis.

Caulis 2–3 cm. longus, simplex vel divisæ. Folia 1 mm. longa, sicca parum mutata, pallide fusca.

JUAN FERNANDEZ.—A few barren stems—*Moseley.*

A very distinct species, but of very uncertain genus. The areolation is of cells variable in size, but all, like their wide walls, pellucid. There is no amphigastrium.

Calypogeia fistulata, Mitt., n. sp.

Caulis procumbens, radicellis pallidis ad terram adhærens; folia sursum incurva, explanata, patentia, approximate imbricata, ovato-oblonga, obtusa, marginibus dorsalibus basi approximatis liberis, ventralibus imbricatis caulem tegentibus; perianthium e caulis medio descendens, elongatum, radiculosum.

Caulis 1 cm. longus, pallidus, crassiusculus; folia 1 mm. longa, e cellulis rotundatis minutissime granulatis limitibus angustis areolata, pallida, carnosula, hic illic roseo tinctis. Tubus perianthii 1 c.m. longus vel brevior, pallidus, radicellis pallidis sparsis.

Juan Fernandez. *Mr W. Saunders' collector.*

A small plant which might at first sight be taken for fragments of *Jungermannia colorata* from the colour of its foliage. The tube is probably at first apical, but is left behind by continuation of the stem, on which several of different lengths are produced. In the very small quantity available for examination no aperture is observable over the top of the tube, the stem being to all appearance continuous, but the tubes are fistulose, and thus not to be confounded with flagella or stolons.

Balantiopsis purpurata, Mitt., n. sp.

Caulis procumbens, subsimplex; folia explanata, lobo ventrali patente divergente ovato, apice dentibus spiniformibus parvis 2–4 armato, basi dorsali cum lobo dorsali quadruple minore late ovato apice 3–4 spinoso dentato appresso breviter confluente; amphigastria parva, profunde quadripartita, laciniis subulatis.

Cæspites depressi, lati, caulibus laxe intertexti 1–2 cm. longi plerumque simplices, foliis pallide fusco albidis 2 mm. latis colore roseo purpureove tinctis, e cellulis elongatis limpidis areolatis.

Juan Fernandez.—Amongst mosses used for packing plants sent by Mr W. Saunders' collector.

This appears to grow in the same manner as *Kantia trochomanis* when the tufts are sufficiently dense that the stems overrun each other. It is not so white as *Balantiopsis diplophylla*, with which it agrees in having the two lobes of its leaves connected with a keel, which is, however, much shorter than in that species; besides which the outline of the leaf is ovate, the terminal teeth small, and the amphigastrium deeply cleft into four narrow laciniæ, arranged in the divergent manner usual in *Lophocolea* and *Chiloscyphus*.[1]

[1] There are two other species which come near to this :—

Balantiopsis versicolor, Mitt., n. sp.—Caulis procumbens ramis remotis divisus; folia lobo ventrali ambitu ovato medio convexo margine, ventrali recurvo, lobo dorsali appresso caulem tegente dimidio minore, ambobus apicibus emarginatis bidentatis marginibus ubique dentibus ciliiformibus fimbriatis basi in carina brevissima coalitis; amphigastria profunde biloba, lobis divergentibus oblongis obtusis ubique ciliatis.

Caulis 2–3 cm. longus ramis remotis alternis cum foliis 2 mm. latus. Folia pallide fusca, apicalia plerumque purpurata.

Valdivia, Sainthill, Reed; also a specimen in the British Museum Herbarium, marked "Oregon, Lobb," probably also Chilian.

Rather smaller than *Balantiopsis purpurata*, and not quite so soft and flaccid, with both lobes of the leaf ciliated all round the margins as well as round the margins of the differently shaped amphigastrium; in the

Gottschea berteroana, Nees.

Gottschea berteroana, Nees in G. L. et. N. Synopsis Hepat., p. 14.
Jungermannia berteroana, Hook., Bot. Misc., i. p. 148, t. 78.
Notarisia lycopodioides, Colla in Mem. Accad. Sc. Torino, xxxix. p. 53, t. 75, fig. 2 ?

JUAN FERNANDEZ. *Bertero; Moseley.*

Barren stems of a smaller state were collected by Mr W. Saunders' collector. It is apparently confined to the island.

We have added *Notarisia* as a synonym of this plant, after a comparison of the descriptions and the inscription on Bertero's label, and there is little doubt that it is the same.

Radula microloba, Gottsche.

Radula microloba, Gottsche in G. L. et N. Synopsis Hepat., p. 259.

JUAN FERNANDEZ. *Bertero;* in a bad state on mosses, gathered by Mr W. Saunders' collector.

The species is very nearly allied to *Radula pallens*, Swartz.

insertion of the leaves, both lobes are placed on the stem in a similar manner to those of some species of *Martinellia*, the middle part of each lobe being attached higher up the stem than the angles and intermediate keel.

Balantiopsis æquifolia, Mitt., n. sp.—Caulis ramis paucis remotis divisus; folia densiuscule inserta, lobis dorsalibus et ventralibus æqualibus basi brevissime in carina coalitis ovatis apice sinu parvo angusto bidentatis, marginibus dentibus paucis spiniformibus ciliatis; amphigastris ovali-rotundatis, apice lobis irregularibus brevibus bispinosis et dentibus spiniformibus remotis ciliata.

Caulis cum foliis 1·50 mm. latus. Folia fusco-alba.

Habitat.—Port Churruca, Magellan; inter *Bruteliam* repens, Cunningham.

In the nearly equal size of the dorsal and ventral leaf-lobes and amphigastrium, equalling in size one of the lobes, as well as in its form, this differs considerably from any of the others.

Balantiopsis erinacea (*Scapania*, Taylor), differs at once from all the other known species in the two leaf-lobes being free at their bases, as is figured, Fl. Ant., t. 161, iv. The outline of the leaf is, however, more orbicular-ovate, bidentate at the point with ciliiform teeth all round. This came from the Falkland Islands. Very incomplete specimens have since been sent from New Zealand, they are not quite certainly the same. *Balantiopsis diplophylla* (*Scapania*, Taylor), from New Zealand, is fairly represented in the figure Fl. Ant., t. 64, iv.; its lobes are connected as in *Martinellia;* it is found also in Tasmania. Another species as it appears was sent from New Zealand by Dr Knight, who sent also a sketch of its perianth, which agrees very nearly with a small specimen gathered previously at New Plymouth, New Zealand. *Balantiopsis knightii*, Mitt., n. sp.—Caulis procumbens; folia explanata, lobo ventrali subrotundo, oblonga, divergentia, apice tri quadridentata, lobo dorsali minuto quadrate ovato apice bitridentato appresso, basi carina brevissima cum dorsale coalito, perianthio oblongo cylindraceo radiculoso, capsula cylindracea, lobis demum in spiram contortis.

This agrees in size with *Balantiopsis diplophylla*, but is in all the few specimens seen a shorter-stemmed plant; its dorsal leaf-lobe is so small that it is not wider than half the diameter of the stem, which is thus left exposed; in all the other species the stem is covered. The ventral lobe is quite entire except at the apex, where it is provided with a few short teeth, thus differing from the spiniform teeth common to the other species.

So far as can be seen in the specimens, the amphigastrium takes no part in the formation of the perianth, which is in all the species terminal, the two leaves immediately next its orifice, but slightly modified in form. All these species agree in their areolation of elongate limpid cells, and in this respect, as well as in the form and insertion of the leaves, differ greatly from *Tylimanthus;* and, indeed, from all the other genera which fruit from a descending sac.

Porella chilensis, Mitt.

Madotheca chilensis, G. L. et N., Synop. Hepat., p. 274.

JUAN FERNANDEZ. — Specimens in a very slender state, without fructification — *Moseley.*

Also in Chili and Peru.

The smallest species of the genus. It appears to be common in Chili, where also is found a state of *Porella stangeri*, Lindenb. et Gottsche, with more densely inserted leaves, and with the margins of its amphigastria more revolute=*Madotheca fœtens*, De Notaris Jung. Amer. Pug., p. 25, fig. xvii.; but the perianth is the same as in specimens from New Zealand. In the Synopsis Hepat., p. 280, the perianth is described as—"Bilabiatum, labiis denticulatis," which is the condition when broken up by the egress of the capsule, before which it is ovate apiculate, and the mouth far too small to allow of the protrusion of the capsule without its disruption.

Lejeunia subfusca, Nees.

Lejeunia subfusca, Nees in G. L. et N. Synopsis Hepat., p. 315.

JUAN FERNANDEZ.—Fragments on *Porotrichum*—*Moseley.* Gathered also by Bertero and by Mr W. Saunders' collector.

Whether this is really identical with the Javan species may be doubtful, for it is quite probable that there is a group of dark-foliaged species which scarcely differ in the barren state.

Riccardius multifidus, Gray.

Riccardius multifidus, Gray, Brit. Pl., i. p. 684.
Aneura multifida, Dumort, Hepat. Europ., p. 141; G. L. et N., Synop. Hepat., p. 496.
Jungermannia multifida, Linn., Sp. Pl., ed. 2, p. 1602.

JUAN FERNANDEZ.—Among mosses—*Mr W. Saunders' collector.*

The fragments being all quite barren, it is impossible to be quite certain that they are specifically identical with the European *Riccardius multifidus*, which is generally supposed to be a common species and found almost everywhere; but it appears from descriptions and from specimens usually found in herbaria that besides the *Aneura latifrons*, Lindenb., there is confused with it *Aneura bipinnata*, Swartz, described originally from West Indian specimens, but which is found in the south of England and Ireland, and is probably very widely spread.

Symphyogyna hochstetteri, Nees et Mont.

Symphyogyna hochstetteri, Nees et Mont. in G. L. et N. Synop. Hepat., p. 485.

JUAN FERNANDEZ. *Moseley.*

Specimen without fruit exactly similar to those gathered by Bertero. It is found also in Chili (Lechler, 187), and is enumerated by Gottsche in the flora of New Grenada.

This species in its habit is intermediate between the species with and without stipes, some of its fronds being stipitate, others are as if indefinite; the foliaceous expansion is irregularly sinuate. In this particular it approaches the *Symphyogyna sinuata* (Sw.), which extends from the West Indian Islands to South Chili, whence also have come specimens of *Symphyogyna hymenophyllum*.[1]

Marchantia berteroana, Lehm. et Lindb.

Marchantia berteroana, Lehm. et Lindb. in G. L. et N. Synop. Hepat., p. 525.

Juan Fernandez.

Originally described from Bertero's specimens. It resembles *Marchantia polymorpha* when in that state in which the dark vein-like marking in the middle of the fronds is wanting, but is more robust than usual in British forms.

Also in Chili.

FUNGI.

No fungi were collected in Juan Fernandez by Mr Moseley, or at least none came to hand.

LICHENES.[2]

Leptogium azureum, Mont.

Leptogium azureum, Mont., Cuba, Crypt., p. 114, et in Gay, Fl. Chil., viii. p. 224; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223; Nyl., Synopsis Lich., i. p. 125.

Juan Fernandez. *Moseley.*

Nylander (*loc. cit.*) places this as a variety of the almost cosmopolitan *Leptogium tremelloides.*

[1] The genus *Umbraculum*, Gottsche, *Bot. Zeit.*, 1861, p. 1–3, and *Ann. Sci. Nat.*, 5ième. sér., t. 1, 1865, p. 180, of which the type is *Jungermannia flabellata*, Hook., Musc. Exot., t. 13, is represented in the Bogotian Andes by *Umbraculum andinum*, Mitt., n. sp., stipite in frondem semicircularem flabellatim expanso, divisionibus tri-quaterne dichotomis integerrimis, squama involucrale rotundata denticulata, calyptra cum perianthio cylindraco basin versus concreta. Stipes 1·50 cm., ala nulla, frondo 1 cm. lata divisionibus 1–1·50 mm. latis, perianthium 2 mm. longum infra squamam involucralem carnosulum.

Other species referred to this genus are *Umbraculum mulleri*, Gottsche, from Australia; *Umbraculum leptopoda*, Tayl., from New Zealand; *Umbraculum decipiens*, Mitt. (*Steetzia*), from Ceylon. All these differ from *Symphyogyna* in having a perianth, as in *Palavicinia = Steetzia*, G. L. et N. Synop. Hepat., p. 785. In another Andean species, *Umbraculum erythropus*, Gottsche in *Ann. Sci. Nat.*, 5ième. sér., t. 1 (*Mittenia*).

The calyptra being concrete with the perianth towards its base, was thought by Gottsche to be worthy of distinction as a generic character; but as this condition certainly occurs in some others of the species referred to *Umbraculum*, it seems hardly of sufficient importance. *Umbraculum erythropus*, in its fronds having their lobes dentate, nearly resembles *Symphyogyna hymenophyllum*, Hook.

[2] Limited to those collected by Mr Moseley.

Bæomyces chilensis, Crombie.

Bæomyces chilensis, Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.
Bæomyces rufus, DC., var. *chilensis*, Nyl., Synopsis Lich., i. p. 177.
Biatora byssoides, Fries, var. *chilensis*, Mont. in Gay, Fl. Chil., viii. p. 173.

JUAN FERNANDEZ. *Moseley.*

Montagne was disposed to regard the Chilian plant as distinct from the European, but having seen no apothecia, he would not found a species. Crombie (*loc. cit.*) says: "This in all probability is to be regarded as a proper species, distinguished by the thin, whitish, rugulose continuous thallus."

Stereocaulon ramulosum, Acharius.

Stereocaulon ramulosum, Acharius, Meth. Lich., p. 314; Nyl., Synopsis Lich., i. p. 235; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

JUAN FERNANDEZ. *Moseley.*

Widely spread in the southern hemisphere, and in America ranging from the Strait of Magellan to Mexico.

Cladonia aggregata, Eschw.

Cladonia aggregata, Eschw.; Nyl., Synopsis Lich., i. p. 218; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223 (*errore Cladia*).

JUAN FERNANDEZ. *Moseley.*

Very widely dispersed in the southern hemisphere, and in America northward to the West Indies.

Sticta subvariabilis, Nyl.

Sticta subvariabilis, Nyl. in Flora, 1867, p. 439; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

JUAN FERNANDEZ. *Moseley.*

Sticta hypopsila, Nyl.

Sticta hypopsila, Nyl., *fide* Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.
Sticta lineariloba, Nyl., var. *hypopsila*, Nyl., Synopsis Lich., i. p. 355.
Sticta filicina, var. *lineariloba*, Mont., subvar. *hypopsila* in Ann. Sci. Nat., sér. 3, xviii. p. 308, et in Gay, Fl. Chil., viii. p. 122.

JUAN FERNANDEZ. *Moseley.*

Sticta lineariloba, Nyl.

Sticta lineariloba, Nyl., Synopsis Lich., i. p. 355; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.
Sticta filicina, var. *lineariloba*, Mont. in Gay, Fl. Chil., viii. p. 355.

JUAN FERNANDEZ. *Moseley.*

Thelotrema sp. ? Crombie.

Thelotrema sp. ? Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

JUAN FERNANDEZ. *Moseley.*

"On the bark of trees: indeterminable."

Urceolaria scruposa, Acharius.

Urceolaria scruposa, Acharius, Lich. Univ., p. 338; Nyl., Lich. Scand., p. 176; Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

JUAN FERNANDEZ. *Moseley.*

A common European species.

Lecidea fernandezii, Crombie.

Lecidea fernandezii, Crombie in Journ. Linn. Soc. Lond., xvi. p. 223.

"Omnino est similis *Lecideæ urceolariæ*, Nyl. in Flora, 1873, p. 298, differt autem hypothecio et perithecio fuscis, sporisque fere minoribus, longit. 0·010–0·014 millim., crassit. 0·004–0·006 millim. Forsan varietas *Lecideæ urceolariæ*."

JUAN FERNANDEZ.—Parasitic on *Urceolaria scruposa*—*Moseley.*

ALGÆ.

MELANOSPERMEÆ.

Zonaria variegata, Lamour.

Zonaria variegata, Lamour., Dict., p. 11; J. G. Agardh, Sp. Alg., i. p. 108; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ.—On *Corallina subulata*. *Moseley.*

Chiefly in the Atlantic; also in the Indian Ocean and on the coast of Australia.

Dictyota kunthii, J. G. Agardh.

Dictyota kunthii, J. G. Agardh, Sp. Alg., i. p. 94, et Ic. ined., t. 15; Gay, Fl. Chil., viii. p. 260; Dickie in Journ. Linn. Soc. Lond., xv. p. 452; Hook. f., Handb. Fl. N. Zeal., p. 657.

JUAN FERNANDEZ. *Moseley.*

Common on the coasts of Chili and New Zealand, and extending northward in the Pacific to California.

Dictyota nævosa, Suhr.

Dictyota nævosa, Suhr; Eckel., n. 8; J. G. Agardh, Sp. Alg., i. p. 95; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

South Africa; Tasmania.

Asperococcus sinuosus, Roth.

Asperococcus sinuosus, Roth, Cat., iii. p. 327; J. G. Agardh, Sp. Alg., i. p. 75; Dickie in Journ. Linn. Soc. Lond., xv. p. 452; Hook. f., Handb. Fl. N. Zeal., p. 658.

Juan Fernandez. *Moseley.*

New Zealand; Australia; Indian Ocean; Red Sea; North and South Atlantic to the Falkland Islands.

Asperococcus echinatus, Mert.

Asperococcus echinatus, Mert.; J. G. Agardh, Sp. Alg., i. p. 76; Hook. f., Handb. Fl. N. Zeal., p. 658; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

Juan Fernandez. *Moseley.*

Australia; Lord Auckland's Group; Eastern and Western North Atlantic.

Chordaria hippuroides, Bory.

Chordaria hippuroides, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 139; Dickie in Journ. Linn. Soc. Lond., xv. p. 452; J. G. Agardh, Sp. Alg., i. p. 67.

Juan Fernandez. *Moseley.*

Previously recorded only from the coast of Chili.

RHODOSPERMEÆ.

Polysiphonia parasitica, Huds.

Polysiphonia parasitica, Huds., Fl. Angl., p. 604, var. *γ reptans*; J. G. Agardh, Sp. Alg., ii. p. 931; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

Juan Fernandez. *Moseley.*

Agardh records this variety from the Pacific Ocean, growing on the fronds of *Phyllospora chamissoi*.

Polysiphonia villum, J. G. Agardh.

Polysiphonia villum, J. G. Agardh, Sp. Alg., ii. p. 941; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

Juan Fernandez.—Growing on *Codium tomentosum*—*Moseley.*

This species was founded upon specimens collected by Liebmann on the coast of Tropical America, and Dickie places the sign of doubt after the name in the Herbarium, though it does not appear in the Linnean Journal.

Corallina subulata, Ell.

Corallina subulata, Ell. et Sol., d. 120, t. 21, ex J. G. Agardh, Sp. Alg., i. p. 570; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

Juan Fernandez. *Moseley.*

Agardh records this from the West Indies and the coast of Brazil near Bahia.

Corallina berteri, Mont.

Corallina berteri, Mont. in Harv. Nereis Australis, p. 103, 1847, et in Gay, Fl. Chil., viii. p. 318 (1852, *berteroana*); Dickie in Journ. Linn. Soc. Lond., xv. p. 452; J. G. Agardh, Sp. Alg., i. p. 566.

JUAN FERNANDEZ. *Moseley.*

Melobesia pustulata, Lamour.

Melobesia pustulata, Lamour, Hist. Polyp. Flex., p. 315, t. 12; Kütz., Sp. Alg., p. 696; Harv., Nereis Australis, p. 110; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

Atlantic, Mediterranean, and Adriatic, and in the Pacific on the coast of Norfolk Island.

Gigartina contorta, Bory.

Gigartina contorta, Bory in Duperr. Voy. "Coquille," Bot. Crypt., p. 153; J. G. Agardh, Sp. Alg., iii. p. 190; Gay, Fl. Chil., viii. p. 335; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

The only previous record of this species is Concepcion (D'Urville).

Ceramium rubrum, Huds.

Ceramium rubrum, Huds., Fl. Angl., p. 600; J. G. Agardh, Sp. Alg., iii. p. 100; Hook. f., Handb. Fl. N. Zeal., p. 707; Gay, Fl. Chil., viii. p. 356; Dickie in Journ. Linn. Soc. Lond., xv. p. 452.

JUAN FERNANDEZ. *Moseley.*

A common and variable seaweed inhabiting the temperate seas of both hemispheres.

Centroceras micracanthum, Kütz.

Centroceras micracanthum, Kütz. in Linnæa, 1842, p. 741, et Sp. Alg., p. 688; Dickie in Journ. Linn. Soc. Lond., xv. p. 452 (*sphalmate micranthum*).

JUAN FERNANDEZ. *Moseley.*

Ptilota parva, Dickie.

Pinnis oppositis difformibus, una minore simplici, subulata, altera majore, pinnulata, pinnulis subulatis obtusis, vel subconicis, omnibus cellulosis. Sphærosporis—? Favellis—? (Dickie in Journ Linn. Soc. Lond., xv. p. 452).

JUAN FERNANDEZ.—A few specimens mixed with *Centroceras*—*Moseley.*

CHLOROSPERMEÆ.

Codium tomentosum, C. A. Agardh.

Codium tomentosum, C. A. Agardh, Sp. Alg., i. p. 452; Kütz., Sp. Alg., p. 500; Hook. f., Handb. Fl. N. Zeal., p. 714; Gay, Fl. Chil., viii. p. 275; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Generally diffused.

Ulva latissima, Linn.

Ulva latissima, Linn., Sp. Pl., ed. 2, p. 1632; Kütz., Sp. Alg., p. 474; Hook. f., Handb. Fl. N. Zeal., p. 715; Gay, Fl. Chil., viii. p. 369; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Generally diffused.

Enteromorpha intestinalis, Link.

Enteromorpha intestinalis, Link., Hor. Phys. Berol., p. 5; Kütz., Sp. Alg., p. 478; Hook. f., Handb. Fl. N. Zeal., p. 716; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Generally diffused.

Chætomorpha ærea, Kütz.

Chætomorpha ærea, Kütz., Sp. Alg., p. 379; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.
Conferva ærea, Dillw., Conf., t. 80; Hook. f., Handb. Fl. N. Zeal., p. 719.

JUAN FERNANDEZ. *Moseley.*

Europe; Australia; New Zealand.

Chætomorpha tortuosa, Kütz.

Chætomorpha tortuosa, Kütz., Sp. Alg., p. 376; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Mediterranean; Adriatic, &c.

Cocconeis scutellum, Ehrenb.

Cocconeis scutellum, Ehrenb., Infus., p. 194, t. 14, fig. 8; Kütz., Sp. Alg., p. 52; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

On both sides of the North Atlantic; Mediterranean; Adriatic.

Melosira nummuloides, Kütz.

Melosira nummuloides, Kütz., Sp. Alg., p. 27; Dickie in Journ. Linn. Soc. Lond., p. 453.

JUAN FERNANDEZ. *Moseley.*

On both sides of the North Atlantic.

Grammatophora marina, Kütz.

Grammatophora marina, Kütz., Bacill., p. 128, t. 17, fig. 24, et Sp. Alg., p. 120; Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Widely spread in the Atlantic and Pacific Oceans.

Biddulphia aurita, Bréb.

Biddulphia aurita, Bréb.; Kütz., Sp. Alg., p. 136 (*Odontella*); Dickie in Journ. Linn. Soc. Lond., xv. p. 453.

JUAN FERNANDEZ. *Moseley.*

Biddulphia pulchella, Gray.

Biddulphia pulchella, Gray ex Dickie in Journ. Linn. Soc. Lond., xv. p. 453; Kütz., Sp. Alg., p. 137 (*Biddulphia trilocularis*, Kütz.)

JUAN FERNANDEZ. *Moseley.*

Kützing records this from the West Indies and the coast of Peru.

Climacosphenia moniligera, Ehrenb.

Climacosphenia moniligera, Ehrenb.; Kütz., Sp. Alg., p. 114; Dickie in Journ. Linn. Soc. Lond., xv. p. 453 (*Climacosphæria sphalmate*).

JUAN FERNANDEZ. *Moseley.*

LIST OF THE JUAN FERNANDEZ CELLULAR CRYPTOGAMS, published by Montagne in the Annales des Sciences Naturelles (série 2, iii. pp. 347–356, iv. pp. 86–99), and in Gay's Flora Chilena, vi. and vii.[1]

MUSCI.

Racopilum tomentosum, Brid.; *Hypnum neckerioides*, Hook.; *Hypnum serrulatum*, Hedw.; *Hypnum aciculare*, Brid.; *Hypnum toxarion*, Schwägr.; *Hypnum crassiusculum*, Schwägr.; *Leskea mollis*, Hedw.; *Hookeria* (*Pterygophyllum*) *splendidissima*, Mont.; *Bartramia stricta*, Brid.; *Macromitrium urceolatum*, Brid.; *Macromitrium fimbriatrum*, Schwägr.; *Notarisia crispata*, Mont.; *Tortula* (*Syntrichia*) *flagellaris*, Mont.; *Trichostomum longifolium*, Brid.; *Campylopus introflexus*, Brid.; *Phascum nervosum*, Hook.

[1] Montagne's nomenclature is retained throughout.

HEPATICÆ.

Gottschea berteroana, Nees.; *Plagiochila neesiana*, Lindb.; *Jungermannia colorata*, Lehm.; *Jungermannia crassula*, Nees et Mont.; *Lophocolea æquifolia*, Nees et Mont.; *Chiloscyphus amphibolius*, Nees; *Trichocolea tomentella*, Dumort; *Radula pallens*, Nees; *Radula microloba*, Gottsche; *Madotheca subsquarrosa*, Nees et Mont.; *Lejeunia acuminata*, Lehm. et Lindb.; *Symphyogyna hochstetteri*, Nees et Mont.; *Marchantia berteroana*, Lehm. et Lindb.

FUNGI.

Agaricus capillaris, Schum.; *Agaricus aulaxinus*, Mont.; *Agaricus variabilis*, Pers.; *Xerotus berterii*, Mont.; *Polyporus dictyopus*, Mont.; *Polyporus senex*, Nees et Mont.; *Polyporus concrescens*, Mont.; *Polyporus versicolor*, Fries; *Polyporus fernandesianus*, Mont.; *Polyporus vaporarius*, Fries; *Polyporus violaceus*, Fries; *Hydnum coralloides*, Scop.; *Hydnum ochraceum*, Pers.; *Hydnum leptodon*, Mont.; *Hydnum niveum*, Pers.; *Odontia cinnamomea*, Mont.; *Stereum tabacinum*, Fries, var. *australe*, Mont.; *Tremella lutescens*, Pers.; *Mitruba berterii*, Mont.; *Peziza abnormis*, Mont.; *Peziza spadiceo-atra*, Mont.; *Peziza cerina*, Pers.; *Helotium citrinum*, Fries; *Patellaria pulla*, Fries; *Xylaria hypoxylon*, Grev.; *Xylaria multiplex*, Kunze; *Rhizomorpha subcorticalis*, Pers.; *Hypoxylon berterii*, Mont.; *Hypoxylon serpens*, Fries; *Hypoxylon anthracodes*, Fries; *Dothidea conspuscata*, Berkl.; *Nectria discophora*, Mont.; *Sphæria mammæformis*, Pers.; *Antennaria robinsonii*, Mont.; *Trichoderma viride*, Pers.; *Æthalium septicum*, Fries; *Trichia clavata*, Pers.; *Ceratium hydnoides*, Alb. et Schw.; *Fusisporium chilense*, Mont.; *Fusisporium ochraceum*, Mont.; *Æcidium cestri*, Mont.; *Æcidium berberidis*, Pers.

LICHENES.

Usnea florida, Hoffm.; *Usnea ceratina*, Acharius; *Ramalina fraxinea*, Acharius; *Ramalina subulata*, Mont.; *Peltigera polydactyla*, Hoffm.; *Nephroma plumbea*, Mont.; *Sticta endochrysa*, Delise; *Sticta hirsuta*, Mont.; *Sticta mougeotiana*, Delise; *Sticta carpoloma*, Delise; *Sticta argyracea*, Delise; *Sticta richardi*, Mont.; *Sticta freycinetii*, Delise; *Sticta filicina*, Acharius; *Sticta berteroana*, Mont.; *Parmelia sphinctrina*, Mont.; *Parmelia rubiginosa*, Acharius; *Parmelia nigro-cincta*, Mont.; *Parmelia gossypina*, Mont.; *Parmelia parvifolia*, Mont.; *Parmelia pholidota*, Mont.; *Parmelia gelida*, Acharius; *Parmelia leucochlora*, Mont.; *Stereocaulon corallinum*, Schreb.; *Cladonia rangiferina*, Hoffm.; *Biatora mutabilis*, Mont.; *Biatora carneola*, Fries; *Heterothecium berteroanum*, Mont.; *Opegrapha scripta*, Acharius; *Sphærophoron compressum*, Acharius; *Pertusaria wulfenii*, DC.; *Pertusaria communis*, DC.; *Pyrenastrum chilense*, Mont.; *Verrucaria analepta*, Acharius; *Verrucaria actinostoma*, Acharius; *Collema saturninum*, Acharius; *Leptogium azureum*, Mont.; *Leptogium marianum*, Mont.

ALGÆ.

Dictyota kunthii, Grev.; *Dictyota phlyctænodes*, Mont.; *Liagora brachyclada*, Dene.

APPENDIX

ON THE VEGETATION OF SAN AMBROSIO AND SAN FELIX.

From San Ambrosio and San Felix we have only seen fragments, without flowers or fruit, of three plants, doubtless Compositæ, collected by Dr Coppinger of H.M.S. "Alert;" but Dr R. A. Philippi [1] has published some particulars of the physical conformation and vegetation of these islands, which is reproduced here in a condensed form, for the little that is known seems to indicate a distinct affinity with the flora of Juan Fernandez.

San Ambrosio and San Felix are in the same longitude as Juan Fernandez, and in about 26° S. latitude, opposite the harbour of Caldera, and distant therefrom nearly 450 English miles. Commander Simpson of the Chilian navy visited both islands in 1869, and reported thereon as follows:—The principal island of the San Ambrosio group is a plateau, about 1300 feet above the level of the sea, and rising perpendicularly from the sea almost all round, with a peak at the south-west end 125 feet higher. On the east side is an arched triangular rock some 125 feet high, running north and south, and separated from the main island by a channel a hundred yards wide. Besides this, there is another rock about sixty-five feet high; and in continuation of the same, distant about three-quarters of a nautical mile, a conical rock 130 feet high, which being white with birds' dung, looked in the distance like a boat under sail. North-west of San Ambrosio, some 200 yards, another rock was visible. The north side of the island is free from rocks, but the south side is studded with reefs. All along the north side only two small bays were seen where landing was feasible, one, half a nautical mile from the north-west point, and the other in the middle. It was only from the latter that the high land could be reached by ascending a small ravine that there runs down to the coast. Learning from Findlay's "Directory of the Pacific Ocean" that a copious spring of good fresh water was reported to exist on the top, it was resolved to make the ascent, which was not accomplished without much difficulty and an hour's toil. On reaching the top of the island, it was found to be nearly elliptical in shape, and two and a half nautical miles long by one broad, and traversed from north to south by ravines, in which were traces of fresh water. But, although the island was traversed in all directions, only sufficient water was found to quench the thirst of the party; therefore it was inferred that the person who informed

[1] *Bot. Zeit.*, 1870, pp. 496-502, t. 2.—Vegetation der Inseln San Ambrosio und San Felix.

Findlay must have visited the island at a more rainy season. The mass of the island is evidently volcanic with veins of granite (?), with gravel and iron (?), covered with a thin layer of sandy earth saturated with guano, loose, and full of rents, as though it had recently undergone some violent shocks. In the middle is a hollow which appears to have been the crater.

With regard to the vegetation, on the flat parts only one species of *Liguerilla* [*Dendroseris?*] existed; it was usually eighteen inches high, but sometimes double that height. In the ravines, where it was damp, there were other plants, of which specimens were collected; but no grass or edible plant was seen. Of living beings, only three kinds of sea-birds were seen, and they were different from those of the Chilian coast, and so tame that one had to be careful to avoid treading upon them in their nests.

Ten nautical miles westward from San Ambrosio is the group of San Felix, which consists of two islands and a rock. The main island measures two nautical miles from east to west by half a mile broad, with a general height of 200 feet, rising in the north-west to 400 feet. There is no beach except in two small spots on the north and west sides; otherwise it is not difficult to reach the plateau. The moss of the island is identical with that of San Ambrosio, but the thickness of the loose layer of earth is greater, being in places as much as a yard. It consists almost wholly of fresh white guano, apparently of excellent quality,[1] and many shiploads of it might be obtained. The vegetation was limited to a single nettle; and the birds were the same as in San Ambrosio. No drinkable water was found. About half a mile west-north-west of the western point of San Felix is a singular rock some 300 feet high with two pointed pyramids; hence the Spaniards have named it "Brigantine," and the English "Peterborough Cathedral."

The specimens of plants were mere fragments, brought away by Commander Simpson in his hat, and were never properly pressed; still Dr Philippi was able to determine them, with the exception of two. And two of the plants collected by Dr Coppinger are evidently the same as two of those described by Philippi. The plants known are:—

MALVACEÆ.

Malva limensis, Linn.

Malva limensis, Linn., Sp. Pl., ed. 2, p. 968? Philippi in Bot. Zeit., 1870, p. 498.

San Ambrosio. *Simpson.*

Philippi hesitates to refer this unconditionally to *Malva limensis*, Linn., because the carpels are furnished with small teeth or spines, instead of being smooth; but all the specimens we have examined that are so named at Kew are more or less prickly. *Malva peruviana*, Linn., is very closely allied, differing in its more evidently prickly carpels. Perhaps they are better regarded as forms of one species, common from New Grenada to Chili. *Malvastrum* is the genus to which the plant is now generally referred.

[1] A sample was subsequently analysed and found to contain very little ammonia; hence it is of little value.

CUCURBITACEÆ.

Sicyos bryoniæfolius, Moris.

Sicyos bryoniæfolius, Moris, Enum. Sem. Hort. Taurin, 1831; Cogniaux in DC. Monogr. Phanerog., iii. p. 884.

Sicyos badaroa, Hook. et Arn. in Hook. Bot. Miscel., iii. p. 324; Gay, Fl. Chil., ii. p. 410; Philippi in Bot. Zeit., 1870, p. 498.

San Ambrosio. *Simpson.*

Common in Peru and Chili, especially in maritime localities.

UMBELLIFERÆ.

Apium, sp? Philippi.

Apium, sp.? Philippi in Bot. Zeit., 1870, p. 499.

San Ambrosio. *Simpson.*

A branch without flowers or fruit, smelling strongly of celery. Philippi could only vouch that it is not *Apium chilense*, for the branch is not furrowed, and the segments of the leaves are much narrower, quite linear, and quite entire.

COMPOSITÆ.

Lycapsus tenuifolius, Philippi.

Lycapsus tenuifolius, Philippi in Bot. Zeit., 1870, p. 499, t. 8a, fig. 1–5; Benth. et Hook., Gen. Plant., ii. p. 240 (*sub Aloma*).

San Ambrosio.—Endemic—*Simpson; Coppinger.*

Simpson's specimen bore flower-heads; but Coppinger's, from the rocks south of the mainland, though otherwise ample, are destitute of both flowers and fruit. It is a shrubby plant, with rather slender branches, and finely cut, deeply pinnatifid, somewhat fleshy leaves. Philippi regarded it as the type of a new genus of the suborder Eupatoriaceæ. In its shrubby habit it is very different from *Aloma*, which Bentham and Hooker, from the description and figure, think it may be; but we have no material to test its claims to generic rank.

Dendroseris? lacerata, Hemsl.

Rea? lacerata, Philippi in Bot. Zeit., 1870, p. 499, t. 8a, fig. 6.

San Ambrosio.—Endemic—*Simpson; Coppinger.*

Philippi founded this species on a single leaf and Simpson's oral information that the stem was about an inch thick, soft, with a milky juice, and only little branched at the ends, with the leaves crowded at the end of the branches. Coppinger's specimens, col-

lected on the rocks south of San Ambrosio, also want flowers and fruit: they consist of portions of the branches, about half an inch thick in the dry state, with three or four leaves at the end. We have little doubt that it belongs to the Cichoriaceæ, and it is most likely a congener of the Juan Fernandez plants of this suborder.

Dr Coppinger also collected a young plant of what may be the same or a closely allied species. It is barely six inches high, with leaves about two inches long.

BORAGINEÆ.

Heliotropium stylosum, Philippi.

Heliotropium stylosum, Philippi in Bot. Zeit., 1870, p. 500.

San Ambrosio.—Endemic—*Simpson*.

Described as a very much branched shrub with crowded linear leaves and crowded flowers; but Philippi was unable to determine whether it was a true *Heliotropium* or *Heliophytum*. He compares it with *Heliophytum pycnophyllum*, Philippi, and *Heliophytum floridum*, DC., Chilian species, with which it agrees in habit, differing in floral characters.

CHENOPODIACEÆ.

Atriplex ? foliolosum, Philippi.

Atriplex ? foliolosum, Philippi in Bot. Zeit., 1870, p. 500.

San Ambrosio.—Endemic—*Simpson*.

A glabrous shrubby species, having crowded, minute, sessile leaves, all bearing gemmæ of two to three leaves in their axils. Flowers and fruit unknown.

URTICACEÆ.

Parietaria feliciana, Philippi.

Parietaria feliciana, Philippi in Bot. Zeit., 1870, p. 501.

San Felix.—Endemic. *Simpson*.

Described apparently as an annual, five inches high, with roundish leaves and hermaphrodite tetrandrous flowers, solitary in a three-leaved involucre. Nothing is said about its affinities.

THE SOUTH-EASTERN MOLUCCAS.

INTRODUCTORY NOTES.

This Report deals with all those islands lying between North-West Australia and South-West New Guinea, and included within 126° and 130° E. longitude, and within 5° and 9° S. latitude, from which there are any collections of plants in the Kew Herbarium. Thus limited, the better known islands of Ceram, Amboina, and Buru are excluded; and Wetter is the most westerly, and the Arrou group the most easterly, of those under consideration. In order to enhance the interest of this Report, some recent collections from the same region at Kew, made by Mr H. O. Forbes and Mr Riedel, have been incorporated with the Challenger collections; yet even with this addition, the whole is a mere fragment of the flora, and almost entirely restricted to the littoral element. Nevertheless, as a contribution to the geographical distribution of plants inhabiting the coasts of tropical seas, this Report possesses, perhaps, as much interest as any one of the botanical series. The Challenger Expedition visited the Arrou and Ki groups, but the botanical collections made by Mr Moseley and other officers reached this country in such a rotten, broken condition that, although the common plants were recognisable, a large proportion of the species are indeterminable, or, if clearly distinguishable from all other known species, the specimens are too imperfect for description. So far as the collections examined are concerned, there is nothing in them indicating an endemic generic element in the flora of the South-eastern Moluccas, for all the apparently undescribed species belong to genera of the Asiatic, Australian, or Polynesian regions; yet from Mr Moseley's description of the vegetation of the Arrou and Ki groups, reproduced below, it must be rich and diversified, and there is little doubt that a thorough exploration of the forests of the interior of the islands would yield a rich harvest. Wallace, too, in his Malay Archipelago, frequently alludes to the variety and luxuriance of the vegetation of the Arrou and Ki groups, and one passage concerning the forests of Arrou is specially interesting. He says (vol. ii. p. 203):—"As I became familiar with the forest scenery of the island, I perceived it to possess some characteristic features that distinguished it from that of Borneo and Malacca, while, what is very singular and interesting, it recalled to my mind half-forgotten impressions of the forests of Equatorial America. For example, the palms were much more abundant than I had generally found them in the East, more generally mingled with the other vegetation, more varied in form and aspect, and presenting some of those lofty and majestic smooth-

stemmed, pinnate-leaved species, which recall the Uanassú (*Attalea speciosa*) of the Amazon, but which I had hitherto rarely met with in the Malayan Islands." In like manner, he found the number and variety of butterflies, spiders, and lizards—to say nothing of the elegant and gorgeously coloured birds—greater than in any other part of the Archipelago. He specially mentions (ii. p. 199), that he had taken about thirty species of butterflies in one day, being more than he had ever captured in the same time since leaving the prolific banks of the Amazon. In another place (ii. p. 184) he says:—"The forests of Kei produce magnificent timber, tall, straight, and durable, of various qualities, some of which are said to be superior to the best Indian teak." Again (p. 189):—"In the forests of Kei arboreal Liliaceæ and Pandanaceæ abound and give a character to the vegetation in the more exposed rocky places. Flowers were scarce, and there were not many orchids, but I noticed the fine white butterfly orchis, *Phalænopsis grandiflora*, or a species closely allied to it. Tall, clean trunks, many of them buttressed, and immense trees of the fig family, with aerial roots stretching out and interlacing and matted together for fifty or a hundred feet above the ground, were the characteristic features; and there was an absence of thorny shrubs and prickly rattans, which would have made these wilds very pleasant to roam in, had it not been for the sharp honeycombed rocks already alluded to. In damp places a fine undergrowth of broad-leaved herbaceous plants was found, about which swarmed little green lizards."

Wallace spent the greater part of his time at Dobbo, in the small island of Wamma, and describing (p. 208) his first visit to Wokan, "an island forming part of the mainland," he says:—"I did not, however, expect in this excursion to see any decided difference in the forest or its productions, and was therefore agreeably surprised. The beach was overhung with the drooping branches of large trees, loaded with Orchideæ, ferns, and other epiphytal plants. In the forest there was more variety, some parts being dry and with trees of a lower growth, while in others there were some of the most beautiful palms I had ever seen, with a perfectly straight smooth slender stem, a hundred feet high, and a crown of handsome drooping leaves. But the greatest novelty and the most striking feature to my eyes were the tree-ferns, which, after seven years spent in the tropics, I now saw in perfection for the first time. All I had hitherto met with were slender species, not more than twelve feet high, and they gave not the least idea of the supreme beauty of trees bearing their elegant heads of fronds more than thirty feet in the air, like those which were plentifully scattered about this forest."

Respecting the physical geography Wallace says (p. 287):—"The whole of Aru is low, but by no means so flat as it has been represented, or as it appears from the sea. Most of it is dry, rocky ground, with a somewhat undulating surface, rising here and there into abrupt hillocks, or cut into steep and narrow ravines. Except the patches of swamp, which are found at the mouths of most of the small rivers, there is no absolutely level ground, although the greatest elevation is probably not more than two hundred feet. The

rock which everywhere appears in the ravines and brooks is a coralline limestone, in some places soft and pliable, in others so hard and crystalline as to resemble our mountain limestone. The small islands which surround the central mass are very numerous . . . and all are covered with a dense and very lofty forest." Here is another short extract, beginning at p. 294, in which Wallace summarises his knowledge and impressions of the vegetation:—"Persons who have formed the usual ideas of the vegetation of the tropics—who picture to themselves the abundance and brilliancy of the flowers, and the magnificent appearance of hundreds of forest trees covered with masses of coloured blossom, will be surprised to learn, that though vegetation in Aru is highly luxuriant and varied, and would afford abundance of fine and curious plants to adorn our hothouses, yet bright and showy flowers are, as a general rule, altogether absent, or so very scarce as to produce no effect whatever on the general scenery. To give particulars: I have visited five distinct localities in the islands, I have wandered daily in the forests, and have passed along upwards of a hundred miles of coast and river during a period of six months, much of it very fine weather, and till just as I was about to leave, I never saw a single plant of striking beauty, hardly a shrub equal to a hawthorn, or a climber equal to a honeysuckle! It cannot be said that the flowering season had not arrived, for I saw many herbs, shrubs, and forest trees in flower, but all had blossoms of a green or greenish-white tint, not superior to our lime-trees. Here and there on the river banks and coasts are a few Convolvulaceæ, not equal to our garden Ipomœas, and in the deepest shades of the forests some fine scarlet and purple Zingiberaceæ, but so few and scattered as to be nothing amid the mass of green and flowerless vegetation. Yet the noble Cycadaceæ and screw-pines, thirty or forty feet high, the elegant tree-ferns, the lofty palms, and the variety of beautiful and curious plants which everywhere meet the eye, attest the warmth and moisture of the tropics and the fertility of the soil. It is true that Aru seemed to me exceptionally poor in flowers, but this is only an exaggeration of a general tropical feature; for my whole experience in the equatorial regions of the west and east has convinced me that in the most luxuriant parts of the tropics, flowers are less abundant, and on the average less showy, and are far less effective in adding colour to the landscape than in temperate climates. I have never seen in the tropics such brilliant masses of colour as even England can show in her furze-clad commons, her heathery mountain-sides, her glades of wild hyacinths, her fields of poppies, her meadows of buttercups and orchises—carpets of yellow, purple, azure-blue, and fiery crimson, which the tropics can rarely exhibit."

With regard to the former physical condition of the Arrou group, Wallace, after reviewing the geological evidence and the distribution of the plants and animals, but more especially the latter, comes to the conclusion that at no very distant epoch these islands formed a part of New Guinea, and became separated by the subsidence of the great plain which formerly connected them with it.

The stay of the Challenger Expedition at the Arrou and Ki islands little exceeded a

week, so there was not much time for the naturalists to explore the botany, and, as already mentioned, the collections contain nothing strikingly peculiar. A few extracts from Moseley's account of the islands[1] may be inserted here:—

"On our way to the Aru Islands we crossed the Arafura Sea, which lies to the west of New Guinea. The sea is extremely shallow, being only from thirty to fifty fathoms in depth. After a voyage of six days from Torres Straits, we sighted the southern part of the Aru Islands, so familiar to naturalists from Mr Wallace's account of them in his Malay Archipelago, and so full of interest to us as the home of birds of paradise.

"We sailed along the western coast of the island. The southern portions are not covered with forest, but appeared in the distance as open grassy downs, and immediately further north similar open country occurs frequently in patches amongst the forest. The grass, though it appears like turf in the distance, is probably tall and reed-like. A line of cliffs of no great height forms the coast line; they are broken at intervals, and there the coast is wooded and shows a white sandy beach.

"The cliffs appear as if formed of a stratified ferruginous red rock. Here and there on the rocks were conspicuous white patches on the cliffs, the nesting-places of boobies, of which large flocks were seen flying to roost as evening came on. Masses of closely-packed tree-stems, with dense foliage crowns above, appeared lining the shore where it was flat; but no cocoanut palms were to be seen amongst them. After coasting during the whole night, Dobbo, the port of the islands, was reached in the morning. Dobbo lies on the small island of Wamma, which is separated opposite the town by a narrow channel from the large island of Wokan. The striking feature in the vegetation of Wamma, as viewed by one who has just been amongst the Pacific Islands, is the very small proportion of palms showing amongst the general mass of foliage, there being only two small clumps of cocoanut-trees near the town. The leafy masses rising above the white beach might almost be taken to be made up of elm-trees, the tree-tops being rounded in the same manner, and the whole has a dull bluish tint. As we neared Dobbo, turning up the passages between the two islands, we passed large quantities of leaves, fruits, and flowers, and branches of trees floated off from the shores, and now drifting about mingled with a floating sea-weed (*Sargassum*). Off the Kei (Ki) Islands we met with similar drifts of land vegetation and also amongst the Moluccas; and I was astonished at the large quantities of fresh vegetable matter thus seen floating on the sea.

"The sea-birds, especially terns, habitually resort to the floating logs as resting-places, and it is curious to see them in the distance appearing as if standing on the surface of the water, the logs themselves being often invisible. Not only are large quantities of fruits [containing seeds] capable of germinating thus transported from island to island, but entire living plants, even trees, are washed from island to island and transplanted by the waves.

"On the shores of Little Kei Island I found on the beach, above the ordinary reach of the waves, a large mass of the pseudo-bulbs of an epiphytic orchid with its roots complete. It was partly buried at the foot of a tree and seemed quite alive, though it had evidently been washed up in a storm. At Malanipa Island, off the coast of Mindanoa Philippines, I found a young sago-palm, which was just beginning to form a stem, washed up just above the ordinary beach-line, and firmly rooted, though in an inclined position, and growing vigorously. Several authors have described the large quantities

[1] Notes by a Naturalist on the Challenger, p. 366–372.

of floating vegetable matter to be met with in the Malay Archipelago and neighbourhood. Chamisso remarked on the quantity of floating seeds off Java, and the casting up of *Barringtonia*, *Aleurites triloba*, and Nipa palm-seeds on the shores in a germinating condition. These large drifts from the forests have a farther interest, in that they let drop their remains to the bottom of the deep sea, thereby not only serving as food to the deep-sea animals, but leaving their husks to be preserved as fossils in deep-sea deposits. I shall refer to this latter point in considering deep-sea questions in the sequel.

"A very large species of screw-pine (*Pandanus*), with a fruit as big as a man's head, is common along the shore. *Pandanus* is a common East Indian littoral genus. The stem, though large, is soft and succulent, and hence with a small axe one can enjoy all the pleasure of felling a large tree without any fatigue. The deep cut made by a single blow is most gratifying to one's feelings of power, and having cut down one tree to obtain a specimen of the fruit, I found myself felling two or three others wantonly.

"On the island of Wokan, not far from the anchorage, sago-palms abound in the swamps. Several parties of natives from the back country were living near the shore, having come from a distance in their boats, to prepare a store of sago to take home with them.

"The trees are excessively high and large in the Aru (Arroo) forests. To a botanical collector, with no time to spare, such a forest is a hopeless problem. Only the few low-growing plants can be gathered, and the orchids and ferns that hang on the stems low down, especially along the coast. A few palms can be cut down. The flowers and fruits of the trees, the main feature of the vegetation, and those most likely to prove of special interest, are far out of reach. The trees cannot be cut down. It would take a day at least to fell one. The only hope is to lie on one's back and look for blossoms or fruit with a binocular glass, and then try and shoot a branch down. Very often, however, the trees are far too high for that, and then the matter must be given up altogether.

"Growing on some of the high trees in Wokan Island, I saw most enormous stags'-horn ferns (*Platycerium*), which I imagined must be at least eight feet in the height of the fronds; I could only reach very small specimens.

"A species of fig, a wide-spreading tree with large leaves, seemed to me remarkable, because the fruit was borne only on the pendent aerial roots. A tree of another species of fig amused me, because its pendent roots had wound spirally around the parent stem of the tree itself, and had nearly choked it. It seemed just that a fig, so accustomed to choking other trees, should thus once in a while choke itself; but no doubt the trees suffered little, the roots taking fully the place of the strangled trunk.

"The rattans are a serious obstacle in excursions in the forests. The tendrils of these trailing and climbing palms are beset with rows of recurved hooks, which as they are drawn across one's flesh, in a dash made to get a shot at a bird, cut into it as readily as knives, but make a more unpleasant wound.

"An immense tree, with a tall stem free from branches, until at a great height it spread out into a wide and evenly-shaped crown, was full of the nests of the metallic starling (*Calornis metallica*); a very beautiful small starling with dark plumage, which displays a brilliant purple metallic glance all over its surface. The birds breed thus gregariously. There must have been three or four hundred nests in the tree; every available branch was full of them. The birds were busy flying to and fro, and were quite safe, for the tree was so high that they were out of shot of my gun at least, which was not a choke-bore.

"The main island, as viewed from seawards, is seen to be densely wooded everywhere. Along the summits of the ridges cocoanut-palms show out against the sky, accompanied by areca-palms, as can be made out on a nearer view. The general dark-green mass of vegetation on the hillsides is festooned with creepers, and the smaller outlying islands dotted about in front of the main island are all thickly wooded. The inhabited ones are distinguished at once by the large number of cocoa-nut-trees growing upon them and forming the main feature of their vegetation. I landed twice upon the mainland. The trees where the shore is not swampy overhang the sea with immense horizontal branches. The bases of many of the trunks of these trees are constantly washed by the waves; but they nevertheless have large woody fungi growing upon them, sometimes attached so low down that they are frequently immersed in salt water. The overhanging branches are loaded with a thick growth of epiphytes; and I had to wade up to my middle in the sea in order to collect specimens of orchids and ferns which hung often only a couple of feet above the water. In other places the shore is swampy, and is either covered with mangroves, or with a dense growth of high trees with tall straight trunks, so closely set that it was very sensibly dark beneath them. In such a grove near Pigeon Island, a small outlier near the anchorage, whilst the ground beneath is bare and muddy, and beset with the bare roots of the trees, the trunks of the trees and fallen logs are covered with a most luxuriant growth of feathery mosses and *Jungermanniæ*. On one of these tree-trunks I found a very curious and rare fern, known before only from Samoa and New Caledonia (*Trichomanes peltatum*). The fronds of the fern are circular in form, and, connected by a slender rhizome, adhere in rows to the bark. They are pressed absolutely flat against the bark, so as to look like an adherent crust, and have all the appearance of a *Riccia* or some such liverwort, for which indeed I took them, as I gathered specimens by shaving off the bark. A species of adders'-tongue fern (*Ophioglossum pendulum*), unlike our humble little English form, grows in abundance, attached to tree stems with long pendulous fronds as much as a yard in length."

Ki Island, as described by Wallace,[1] is very rugged and mountainous, the mountains rising to a height of three or four thousand feet, and being everywhere covered with a lofty, dense, unbroken forest, like the low, flat Arrou. Further particulars respecting the botany and physical features of this and the other islands are wanting.

Little or nothing beyond the foregoing extracts seems to have been published on the botany of the islands under consideration;[2] even in Miquel's Flora Indiæ Batavæ, which professedly includes them, they are very rarely mentioned, if at all, in the distribution of the species; Amboina, Ceram, and Timor, on the other hand, being commonly cited. Indeed, the flora of the first-named island forms the foundation of the great illustrated Herbarium Amboinense of Rumpf, which was written during the latter part of the seventeenth century, and published about the middle of the eighteenth. It is one of the few pre-Linnean works commonly cited in modern publications. The botany of Timor is also tolerably well known, and forms the subject of a special treatise[3] by the late Professor Decaisne, based upon collections made by the naturalists of various French expeditions. For purposes of comparisons the statistics of this flora will be given below.

[1] Malay Archipelago, p. 176 *et seq.*, London, 1869.

[2] A number of plants published by Dr Ed. Beccari had been overlooked: a list is added at p. 223 *et seq.*

[3] Herbarii Timorensis Descriptio.

The following table includes those flowering plants from the South-eastern Moluccas contained in the collections made by Moseley, Riedel, and Forbes which could be identified with some degree of certainty. It is intended to show their distribution outside of the Archipelago, their distribution within being given in more or less detail under each species in the enumeration which follows. Mauritius, Bourbon, and Madagascar are regarded as belonging to the African area; and Polynesia includes all the Pacific Islands eastward of the Philippines, New Guinea, and Australia, though as a matter of fact very few of the plants are recorded as Polynesian which do not extend as far eastward as the Fijis.

TABLE *exhibiting the Distribution of the Flowering Plants of the South-eastern Moluccas.*

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
RANUNCULACEÆ.					
Naravelia zeylanica	×	...	...	...	...
ANONACEÆ.					
Popowia filipes	...	...	...	...	...
MENISPERMACEÆ.					
Anamirta cocculus	×	...	...	...	...
Stephania rotunda	×	...	...	...	...
Cissampelos pareira	×	...	×	×	×
PAPAVERACEÆ.					
Argemone mexicana	×	...	...	×	×
CRUCIFERÆ.					
Brassica juncea	×	...	...	×	...
CAPPARIDEÆ.					
Polanisia viscosa	×	...	×	×	×
Gynandropsis pentaphylla	×	...	...	×	×
Capparis sepiaria	×	...	...	...	...
Capparis spinosa	×	×	...	×	...
VIOLARIEÆ.					
Ionidium suffruticosum	×	...	×	×	...
PITTOSPOREÆ.					
Pittosporum revolutum	...	...	×	...	...
PORTULACEÆ.					
Portulaca oleracea	×	×	×	×	×
GUTTIFERÆ.					
Ochrocarpus ovalifolius	...	×	...	...	...
Calophyllum inophyllum	×	×	×	×	...
DIPTEROCARPEÆ.					
Vateria papuana	...	×	...	...	...
MALVACEÆ.					
Sida rhombifolia	×	×	×	×	×
Sida carpinifolia	×	...	...	×	×
Sida humilis	×	...	...	×	×
Abutilon indicum	×	...	×	×	×
Abutilon graveolens	×	...	×	×	×
Urena lobata	×	×	×	×	×
Hibiscus rosa-sinensis	×	×	...	...	...
Hibiscus surattensis	×	...	...	×	...
Hibiscus tetraphyllus	×	...	...	...	...
Hibiscus vitifolius	×	...	×	×	×
Hibiscus virgatus	...	...	...	...	...
Hibiscus tiliaceus	×	×	×	×	×
Thespesia populnea	×	×	×	×	×
Thespesia lampas	×	...	...	×	...
Gossypium barbadense	×	×	...	×	×
Gossypium herbaceum	×	...	...	×	×
Bombax insigne	×	...	...	...	...
STERCULIACEÆ.					
Sterculia fœtida	×	...	×	×	...
Heritiera littoralis	×	×	×	×	...
Kleinhovia hospita	×	×	...	×	×
Helicteres isora	×	...	×	...	...
Melochia velutina	×	...	...	...	...
Melochia odorata	...	×	...	...	...
TILIACEÆ.					
Brownlowia riedelii	...	...	...	...	...
Triumfetta rhomboidea	×	...	...	×	×
Triumfetta annua	×	...	...	×	...
Corchorus olitorius	×	×	×	×	×
Corchorus acutangulus	×	...	×	×	×
Corchorus trilocularis	×	...	×	×	...
MALPIGHIACEÆ.					
Ryssopterys timorensis	...	...	×	...	...
Tristellateia australasica	×	...	×	...	...
ZYGOPHYLLEÆ.					
Tribulus cistoides	×	×	×	×	×
GERANIACEÆ.					
Averrhoa carambola	×	...	...	...	×
RUTACEÆ.					
Glycosmis pentaphylla	×	×	×	...	...
Micromelum pubescens	×	×	×	...	...
Murraya exotica	×	...	×	...	...
Atalantia nitida	...	...	...	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
SIMARUBEÆ.					
Suriana maritima	×	×	×	×	×
Harrisonia brownii	...	...	×	...	...
MELIACEÆ.					
Aglaia elæagnoides	...	×	×	...	...
Owenia cerasifera	...	...	×	...	...
Carapa moluccensis	×	×	×	×	...
OLACINEÆ.					
Cardiopteris lobata	×	...	...	...	...
Ximenia americana	×	×	×	×	×
CELASTRINEÆ.					
Euonymus javanicus	...	...	...	...	...
Gymnosporia montana	×	...	×	×	...
Hippocratea grahami	×	...	...	...	...
RHAMNEÆ.					
Smythea pacifica	...	×	...	...	...
Alphitonia excelsa	...	×	×	...	...
Gouania microcarpa	×	...	...	...	...
AMPELIDEÆ.					
Vitis repens	×	...	...	...	...
Vitis tenuifolia	×	...	...	...	...
Leea sambucina	×	×	×	×	...
Leea æquata	×	×	...	...	...
SAPINDACEÆ.					
Erioglossum edule	×	...	×	...	...
Allophylus cobbe	×	...	×	...	...
Schleichera trijuga	×	...	...	...	...
Dodonæa viscosa	×	×	×	×	×
ANACARDIACEÆ.					
Buchanania angustifolia	×	...	×	...	...
Buchanania arborescens	...	...	...	...	...
Semecarpus heterophyllus	...	...	...	...	...
MORINGEÆ.					
Moringa pterygosperma	×	...	...	...	...
LEGUMINOSÆ.					
Crotalaria linifolia	×	...	×	...	...
Crotalaria sericea	×	×	...	...	...
Indigofera anil	×	×	...	×	×
Indigofera linifolia	×	...	×	×	...
Tephrosia purpurea	×	×	×	×	×
Sesbania grandiflora	×	×	×	×	...
Sesbania aculeata	×	×	×	×	×
Desmodium gangeticum	×	...	×	×	×
Desmodium latifolium	×	...	...	×	×
Desmodium polycarpum	×	×	×	×	...
Desmodium laxiflorum	×	...	...	...	...
Desmodium ormocarpoides	×	...	...	...	...
Desmodium umbellatum	×	×	×	×	×
Uraria crinita	×	...	...	...	...
Phylacium bracteosum	...	...	...	...	...
Abrus precatorius	×	×	×	×	×
Clitoria ternatea	×	×	...	×	×

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Mucuna pruriens	×	...	×	×	×
Mucuna bracteata	×	...	...	...	...
Galactia tenuiflora	×	...	×	×	×
Canavalia ensiformis	×	...	...	×	×
Canavalia obtusifolia	×	×	×	×	×
Vigna lutea	×	×	×	×	×
Vigna luteola	×	...	×	×	×
Psophocarpus tetragonolobus	×	...	...	...	...
Dolichos lablab	×	×	...	×	×
Cajanus indicus	×	...	...	×	×
Flemingia strobilifera	×	...	...	×	×
Derris uliginosa	×	×	×	×	...
Pongamia glabra	×	×	×	×	...
Inocarpus edulis	...	×	...	...	...
Sophora tomentosa	×	×	×	×	×
Peltophorum ferrugineum	×	...	×	...	...
Cæsalpinia nuga	×	×	×	...	...
Cæsalpinia pulcherrima	×	×	...	×	×
Cæsalpinia bonducella	×	×	×	×	×
Cassia fistula	×	...	...	×	×
Cassia alata	×	...	...	×	×
Cassia javanica	...	...	...	...	...
Cassia sophera	×	×	×	×	×
Cassia tora	×	...	×	×	×
Cassia megalantha	...	...	...	...	...
Cassia mimosoides	×	...	×	×	×
Bauhinia blancoi	×	...	...	...	...
Cynometra ramiflora	×	...	×	...	...
Entada scandens	×	×	×	×	×
Dichrostachys nutans	...	...	×	×	...
Acacia farnesiana	×	×	×	×	×
ROSACEÆ.					
Rubus glomeratus	×	...	...	...	...
CRASSULACEÆ.					
Bryophyllum calycinum	×	...	...	×	×
RHIZOPHOREÆ.					
Rhizophora mucronata	×	×	×	×	...
Bruguiera rheedii	×	×	×	×	...
Bruguiera caryophylloides	×	...	...	...	...
COMBRETACEÆ.					
Lumnitzera coccinea	×	×	×	...	...
Gyrocarpus jacquini	×	×	×	×	×
MYRTACEÆ.					
Melaleuca leucadendron	×	...	×	...	...
Rhodomyrtus macrocarpa	...	...	×	...	...
Nelitris paniculata	×	...	×	...	...
Eugenia javanica	×	...	...	...	...
Eugenia malaccensis	×	...	...	...	×
Barringtonia speciosa	×	×	×	×	...
Barringtonia racemosa	×	×	...	×	...
LYTHRARIEÆ.					
Pemphis acidula	×	×	×	×	...
CUCURBITACEÆ.					
Luffa ægyptiaca	×	×	×	×	×

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Citrullus vulgaris	×	×	...	×	×
Momordica charantia	×	×	...	×	×
Lagenaria vulgaris	×	×	×	×	×
Cucumis trigonus	×	...	×	...	×
FICOIDEÆ.					
Sesuvium portulacastrum	×	×	×	×	×
UMBELLIFERÆ.					
Carum roxburghianum	×	...	...	...	...
ARALIACEÆ.					
Heptapleurum venulosum	×	...	×	...	...
RUBIACEÆ.					
Oldenlandia paniculata	×	×	...	...	...
Webera dallachiana	...	...	×	...	...
Guettarda speciosa	×	×	×	×	...
Ixora grandifolia	×	...	...	...	...
Ixora timorensis	...	...	×	...	...
Ixora paludosa	...	...	...	...	...
Pavetta indica	×	...	×	...	...
Coffea bengalensis	×	...	...	...	...
Morinda citrifolia	×	×	×	×	×
Morinda bracteata	×	...	...	...	...
COMPOSITÆ.					
Vernonia cinerea	×	...	×	×	...
Vernonia chinensis	×	...	...	...	...
Adenostemma viscosum	×	×	×	×	×
Ageratum conyzoides	×	×	×	×	×
Blumea laciniata	×	...	...	...	...
Blumea lacera	×	×	×	×	...
Blumea membranacea	×	...	...	...	...
Blumea balsamifera	×	...	...	...	...
Blumea wightiana	×	...	×	×	...
Pluchea indica	×	...	×	...	...
Wedelia biflora	×	×	×	×	...
Bidens pilosa	×	×	×	×	×
Emilia sonchifolia	×	...	...	×	×
GOODENOVIEÆ.					
Scævola kœnigii	×	×	×	...	...
PLUMBAGINEÆ.					
Ægialitis annulata	...	...	×	...	...
Plumbago zeylanica	×	×	×	×	...
MYRSINEÆ.					
Mæsa nemoralis	...	×	...	...	...
SAPOTACEÆ.					
Mimusops kauki	×	...	×	...	...
EBENACEÆ.					
Diospyros maritima	...	...	×	...	...
OLEACEÆ.					
Jasminum sambac	×	...	...	...	...
Jasminum didymum	...	×	×	...	...
Jasminum lancifolium	...	...	...	...	...
Linociera ramiflora	×	...	×	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
APOCYNACEÆ.					
Rauwolfia amsoniæfolia	...	...	...	...	...
Cerbera odollam	×	×	×	...	...
Ochrosia borbonica	×	...	...	×	...
Plumeria acutifolia	×	...	...	...	×
Tabernæmontana orientalis	×	×	×	...	...
Tabernæmontana floribunda	...	...	...	...	...
Alstonia spectabilis	...	...	...	...	...
Parsonsia spiralis	×	×	...	...	...
Wrightia calycina	...	...	...	...	...
Anodendron paniculatum	×	...	...	...	...
ASCLEPIADEÆ.					
Calotropis gigantea	×	...	...	...	...
Asclepias curassavica	×	×	×	×	×
Ceropegia horsfieldiana	×	...	×	...	...
BORAGINEÆ.					
Cordia subcordata	×	×	×	×	...
Tournefortia argentea	×	×	×	×	...
Tournefortia sarmentosa	...	...	×	×	...
Heliotropium indicum	×	...	×	×	×
CONVOLVULACEÆ.					
Ipomœa angustifolia	×	...	×	×	...
Ipomœa vitifolia	×	...	...	...	...
Ipomœa hederacea	×	...	×	×	×
Ipomœa turpethum	×	×	×	×	...
Ipomœa glaberrima	...	×	...	×	...
Ipomœa cymosa	×	...	×	×	...
Ipomœa biloba	×	×	×	×	×
Hewittia bicolor	×	...	...	×	...
Convolvulus parviflorus	×	...	×	×	...
Cuscuta reflexa	×	...	...	...	...
SOLANACEÆ.					
Lycopersicum esculentum	×	...	...	×	×
Solanum indicum	×	...	...	...	...
Solanum verbascifolium	×	...	×	...	×
Solanum torvum	×	...	...	...	×
Physalis minima	×	...	×	×	×
Capsicum frutescens	×	...	...	×	×
Datura alba	×	...	...	×	×
Nicotiana tabacum	×	×	...	×	×
SCROPHULARINEÆ.					
Buchnera ramosissima	...	...	×	...	...
BIGNONIACEÆ.					
Dolichandrone rheedii	×	...	...	...	...
PEDALINEÆ.					
Sesamum indicum	×	...	...	×	×
Josephinia imperatricis	...	...	×	...	...
ACANTHACEÆ.					
Ruellia aruensis	...	...	...	...	...
Hemigraphis reptans	...	×	...	...	...
Hemigraphis parabolica	...	...	...	...	...
Acanthus ilicifolius	×	×	×	...	...
Barleria prionitis	×	...	...	×	...
Asystasia intrusa	×	...	...	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Eranthemum variabile	...	...	×	...	...
Eranthemum album	×	...	...	...	...
Lepidagathis hyalina	×	×	...	...	...
Lepidagathis javanica	...	...	...	...	...
Justicia gendarussa	×	...	...	×	×
Graptophyllum hortense	×	×	...	×	×
Dicliptera burmanni	×	...	...	...	...
Hypoestes floribunda	...	...	×	...	...
MYOPORINEÆ.					
Myoporum acuminatum	...	...	×	...	...
VERBENACEÆ.					
Callicarpa cana	×	...	×	...	...
Callicarpa longifolia	×	...	×	...	...
Callicarpa pedunculata	...	...	×	...	...
Clerodendron inerme	×	×	×	...	...
Clerodendron longiflorum	...	...	...	...	...
Premna integrifolia	×	...	×	...	...
Premna obtusifolia	...	...	×	...	...
Vitex trifolia	×	×	×	×	...
Vitex negundo	×	...	...	×	...
Vitex pubescens	×	...	...	...	...
Petræovitex riedelii	...	...	...	...	...
Avicennia officinalis	×	×	×	×	×
LABIATÆ.					
Ocimum sanctum	×	...	×	×	...
Ocimum basilicum	×	×	...	×	...
Plectranthus parviflorus	...	×	×	...	...
Coleus scutellarioides	...	×	×	...	...
Hyptis spicigera	...	...	...	×	×
Anisomeles salviæfolia	...	...	×	...	...
Anisomeles ovata	×	...	...	...	...
Leucas javanica	...	...	...	...	...
Leucas decemdentata	...	×	...	...	...
Cymaria acuminata	...	...	...	...	...
NYCTAGINEÆ.					
Mirabilis jalapa	×	...	...	×	×
Boerhaavia diffusa	×	×	×	×	...
Pisonia aculeata	×	×	×	×	×
AMARANTACEÆ.					
Deeringia celosioides	×	×	×	...	...
Deeringia altissima	...	×	×	...	...
Celosia argentea	×	...	...	×	×
Allmania albida	×	...	...	...	...
Amarantus spinosus	×	...	...	×	×
Amarantus caudatus	×	...	...	×	...
Amarantus viridis	×	×	×	×	×
Pupalia lappacea	×	...	...	×	...
Achyranthes aspera	×	×	×	×	×
Nothosærua brachiata	×	...	...	×	...
Gomphrena globosa	×	×	...	×	×
Gomphrena canescens	...	...	×	...	...
CHENOPODIACEÆ.					
Salsola kali	×	×	×	×	×
ARISTOLOCHIACEÆ.					
Aristolochia indica	×	...	×	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
MYRISTICEÆ.					
Myristica insipida	...	...	×	...	...
LAURINEÆ.					
Cassytha filiformis	×	×	×	×	×
Hernandia peltata	×	×	×	×	...
PROTEACEÆ.					
Grevillea gibbosa	...	...	×	...	...
LORANTHACEÆ.					
Loranthus longiflorus	×	...	×	...	...
SANTALACEÆ.					
Exocarpus latifolia	...	...	×	...	...
EUPHORBIACEÆ.					
Euphorbia atoto	×	×	×	...	...
Euphorbia antiquorum	×	...	...	...	...
Euphorbia pilulifera	×	×	×	×	×
Phyllanthus reticulatus	×	...	×	×	×
Phyllanthus niruri	×	×	...	×	×
Phyllanthus diversifolius	×	...	...	...	...
Breynia fruticosa	×	...	...	...	...
Jatropha curcas	×	×	...	×	×
Aleurites moluccana	×	×	×	×	...
Codiæum variegatum	...	×	...	...	...
Manihot utilissima	×	×	...	×	×
Claoxylon rubescens	...	...	...	...	...
Acalypha grandis	...	×	...	...	...
Acalypha pancheriana	...	×	...	...	...
Acalypha indica	×	...	...	...	...
Mallotus ricinoides	×	...	×	...	...
Mallotus philippinensis	×	...	×	...	...
Mallotus muricatus	×	...	...	...	...
Mallotus albus	×	...	...	...	...
Mallotus moluccanus	...	×	...	...	...
Mallotus repandus	×	×	×	...	...
Macaranga tanarius	×	×	×	...	...
Macaranga involucrata	...	...	×	...	...
Ricinus communis	×	×	×	×	×
Gelonium bifarium	...	...	×	...	...
Carumbium populifolium	...	×	×	...	...
Excæcaria agallocha	×	×	×	...	...
URTICACEÆ.					
Celtis paniculata	...	×	×	...	...
Trema timorensis	...	...	...	...	...
Trema angustifolia	×	...	...	...	...
Fatoua pilosa	×	×	×	...	...
Ficus pilosa	...	...	×	...	...
Ficus retusa	×	...	×	...	...
Ficus benjamina	×	...	×	...	...
Ficus quercifolia	...	...	...	...	...
Ficus ampelas	...	...	...	...	...
Ficus rostrata	...	...	...	...	...
Ficus decaisneana	...	...	...	...	...
Ficus fistulosa	×	...	...	...	...
Ficus ribes	...	...	...	...	...
Ficus magnifolia	...	...	×	...	...
Ficus pumila	×	...	...	...	...
Fleurya interrupta	×	×	×	×	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Laportea crenulata	×	...	...	...	...
Procris pedunculata	...	×	...	×	...
Pouzolzia pentandra	×	...	...	...	...
Pipturus argenteus	...	×	×	...	...
Pipturus velutinus	...	×	...	...	...
Leucosyke capiteliata	...	×	...	...	...
Casuarineæ.					
Casuarina equisetifolia	×	×	×	×	×
Gnetaceæ.					
Gnetum scandens	×	...	...	...	...
Hydrocharideæ.					
Enhalus acoroides	×	...	×	×	...
Halophila ovalis	×	×	×	×	...
Orchideæ.					
Dendrobium phalænopsis	...	...	...	...	...
Phalænopsis amabilis	...	...	...	...	...
Vanda lissochiloides	...	...	...	...	...
Scitamineæ.					
Riedelia curviflora	...	...	...	...	...
Clinogyne grandis	...	...	...	×	...
Amaryllideæ.					
Eurycles amboinensis	...	...	×	...	...
Crinum pedunculatum	...	...	×	...	...
Crinum asiaticum	×	×	×	...	...
Taccaceæ.					
Tacca pinnatifida	×	×	×	×	...
Liliaceæ.					
Dracæna angustifolia	×	...	×	...	...

Name.	Continental Asia.	Polynesia.	Australia.	Africa.	America.
Cordyline terminalis	×	×	×	...	...
Dianella ensifolia	×	×	×	×	...
Commelinaceæ.					
Pollia sorzogonensis	×	×	...	...	...
Commelina nudiflora	×	×	×	×	×
Flagellarieæ.					
Flagellaria indica	×	×	×	×	...
Palmæ.					
Cocos nucifera	×	×	×	×	×
Nipa fruticans	×	...	×	...	...
Naiadaceæ.					
Zostera nana	...	...	×	×	...
Cyperaceæ.					
Cyperus ferax	×	×	×	×	×
Cyperus pennatus	×	×	×	×	...
Gramineæ.					
Panicum sanguinale	×	×	×	×	×
Setaria macrostachya	×	...	×	...	×
Setaria verticillata	×	×	×	×	×
Cenchrus calyculatus	...	×	...	...	...
Stenotaphrum subulatum	...	×	...	×	...
Spinifex squarrosus	×	...	...	...	...
Spinifex fragilis	...	...	×	...	...
Coix lachryma	×	×	...	×	×
Imperata arundinacea	×	×	×	×	×
Anthistiria gigantea	×	...	...	...	...
Eleusine indica	×	×	×	×	×
Centotheca lappacea	×	×	×	×	...
Cycadeæ.					
Cycas circinalis	×	×	...	×	...

An analysis of the foregoing table yields some interesting facts. Thus the 367 species belong to 263 genera, giving barely 1·4 species per genus; and the 263 genera belong to eighty-three natural Orders, or about 3·2 genera per Order.

Out of 263 genera, 205 are represented by only one species each, and 39 are represented by two each. The genera numbering more than two species are:—*Sida*, 3; *Hibiscus*, 6; *Corchorus*, 3; *Desmodium*, 6; *Cæsalpinia*, 3; *Cassia*, 7; *Ixora*, 3; *Blumea*, 5; *Jasminum*, 3; *Ipomœa*, 7; *Solanum*, 3; *Callicarpa*, 3; *Vitex*, 3; *Amarantus*, 3; *Euphorbia*, 3; *Phyllanthus*, 3; *Acalypha*, 3; *Mallotus*, 6; and *Ficus*, 11.

Out of 83 natural Orders, 35 are represented by only one genus and one species each, while the following thirteen natural Orders comprise ten or more species each:—

Leguminosæ . . . 48	Compositæ 13	Rubiaceæ . . . 10
Euphorbiaceæ . . 27	Verbenaceæ . . . 12	Apocynaceæ . . . 10
Urticaceæ . . . 22	Amarantaceæ . . . 12	Labiatæ . . . 10
Malvaceæ . . . 17	Gramineæ 12	Convolvulaceæ . . 10
Acanthaceæ . . . 14		

The relatively large proportion of Leguminosæ, amounting to over 13 per cent. of the whole, may be accounted for partly by the fact that several of the species of this Order are commonly cultivated, and have thereby become so widely diffused in a wild state, and partly by the fact that the seeds of many members of this Order will bear long immersion in sea water without losing their vitality, and often germinate when cast ashore after having been conveyed long distances by oceanic currents.

With regard to the proportions of the various natural Orders, it is very probable that an analysis of the complete flora of these islands would give very different results, for we know that the present collections are almost entirely composed of the littoral element. Nevertheless, the analysis given by Decaisne[1] of the flora of Timor offers very similar proportions. The total number of species enumerated by Decaisne is 550, whereof 100 are monocotyledons and ferns, leaving 450 dicotyledons, representing a large number of genera and natural Orders; the Orders (including ferns) most numerously represented being:—

Leguminosæ	63	Cyperaceæ	20	Buettneriaceæ[2]	13
Gramineæ	33	Malvaceæ	18	Myrtaceæ	12
Euphorbiaceæ	28	Acanthaceæ	17	Verbenaceæ	12
Urticaceæ	26	Convolvulaceæ	15	Solanaceæ	11
Compositæ	24	Rubiaceæ	14	Labiatæ	11
Filices	22				

It will be seen that the natural Orders are nearly the same in the two instances. Ferns, if included, would occupy a similar position in our flora. Taking the other Orders not among ours, represented by ten or more species, the numbers are:—Myrtaceæ, 7; Buettneriaceæ, 0; Solanaceæ, 8; and Cyperaceæ, 2; in the present collection from the South-eastern Moluccas. Of these Orders the Cyperaceæ are perhaps the likeliest to receive a considerable accession to the present number in future collections. It should be mentioned that Decaisne retains the Artocarpeæ as a distinct Order from the Urticaceæ, and of the former he describes thirteen species, eleven of *Ficus* and two of *Artocarpus*.

Examining the distribution of the plants in the foregoing table, we find that out of the 367, 274, or about 74·7 per cent., extend to Continental Asia; 193, or about 52·6 per cent., to Australia; 165, or nearly 45 per cent., to Africa; 137, or 37 per cent., to Polynesia; and 107, or 29 per cent., to America. Taking the Malayan Archipelago as one geographical area or region, 35 out of the 367 are restricted to it; in other words, 332 out of 367 extend to one or more of the other geographical areas. The number extending to three areas is 227; while 165 are spread over four areas, and 109 over five areas. Finally, 48 of the species, or 13 per cent., occur in all six areas. These are:—

Portulaca oleracea, Sida rhombifolia, Urena lobata, Hibiscus tiliaceus, Thespesia

[1] Herbarii Timorensis Descriptio, p. 8.

[2] A tribe of Sterculiaceæ, not represented in our collections.

populnea, Corchorus olitorius, Tribulus cistoides, Suriana maritima, Ximenia americana, Dodonæa viscosa, Tephrosia purpurea, Sesbania aculeata, Desmodium umbellatum, Abrus precatorius, Canavalia obtusifolia, Vigna lutea, Sophora tomentosa, Cæsalpinia bonducella, Cassia sophera, Entada scandens, Acacia farnesiana, Gyrocarpus jacquini, Luffa ægyptiaca, Lagenaria vulgaris, Sesuvium portulacastrum, Morinda citrifolia, Adenostemma viscosum, Ageratum conyzoides, Bidens pilosa, Asclepias curassavica, Ipomœa biloba, Avicennia officinalis, Boerhaavia diffusa, Pisonia aculeata, Amarantus viridis, Achyranthes aspera, Salsola kali, Cassytha filiformis, Euphorbia pilulifera, Ricinus communis, Casuarina equisetifolia, Commelina nudiflora, Cocos nucifera, Cyperus ferax, Panicum sanguinale, Setaria verticillata, Imperata arundinacea, and *Eleusine indica.*

Three of these 47 also occur in the south of Europe, namely, *Portulaca oleracea, Amarantus viridis,* and *Salsola kali.*

The present general diffusion of these plants is due to a variety of causes, of which there are two primary ones, namely, cultivation and natural dispersion; the latter including every agency, except that arising out of the direct or indirect interference of man. The plants owing their wide range to cultivation fall into two categories—the cultivated plants, and those associated with them and commonly designated weeds. *Lagenaria vulgaris* and *Canavalia obtusifolia* are examples of the former category, and *Amarantus viridis* and *Euphorbia pilulifera* of the latter; while *Suriana maritima* and *Gyrocarpus jacquini* have perhaps as certainly been dispersed independently of the operations of man. Further particulars of the distribution and probable means of dispersion are given under many of the species in the body of the work.

The following lists of plants from remote oceanic islands show more clearly the cosmopolitan character of the littoral flora of the South-eastern Moluccas than mere words can do.

List of Plants from the Keeling or Cocos Islands, collected by the late C. DARWIN *in* 1836.

Hibiscus tiliaceus, Linn.
Triumfetta procumbens, Forst.
Pemphis acidula, Forst.
Portulaca oleracea, Linn.
Cæsalpinia bonduc, Roxb.
Acacia farnesiana, Linn.?
Scævola kœnigii, Vahl.
Guettarda speciosa, Linn.
Cordia orientalis, R. Br.
Tournefortia argentea, Linn.
Dicliptera burmanni, Nees?
Ochrosia parviflora, Hensl.
Boerhaavia diffusa, Willd.
Achyranthes argentea, Lam.?
Urera gaudichaudiana, Hensl.
Panicum sanguinale, Linn.?
Stenotaphrum lepturoide, Hensl.
Lepturus repens, Forst.
Cocos nucifera, Linn.

The Keeling or Cocos Islands are situated in the Indian Ocean in about 12° S. latitude, and 98° E. longitude. They are low coral formations, and the largest is about five miles long, and a quarter of a mile broad, and the group is about six hundred miles distant from the nearest land. The above list was published[1] by the late Professor

[1] *Ann. Nat. Hist.*, i. p. 337, 1838.

Henslow, who regarded two of the plants as new species. We have not seen the specimens, but from the description and figure of *Stenotaphrum lepturoide* we believe it is nothing more than *Stenotaphrum americanum*, Schrank, which is a common littoral grass in the tropical regions of both hemispheres, and not very different from the *Stenotaphrum subulatum* of our list. And *Urera gaudichaudiana*, Hensl., is treated by Weddell[1] as a variety of the widely spread *Fleurya æstuans*, Gaud. The *Cæsalpinia* may be correctly named, or it may be the much commoner *Cæsalpinia bonducella*, for the two species have been much confused; though both doubtless owe their wide dispersion in part, at least, to oceanic currents. *Triumfetta procumbens* is a common seaside plant in the Archipelago and Polynesia, and is also found on the coast of North-eastern Australia. *Cordia orientalis* is a synonym of the *Cordia subcordata* of our list. *Ochrosia parviflora*, Hensl. (*Cerbera parviflora*, Forst.), is a common seaside tree in the Pacific Islands, and also occurs in North-eastern Australia. *Achyranthes argentea* is a variety of *Achyranthes aspera*, rather than a distinct species, and *Lepturus repens* is a common Polynesian and Australian littoral grass.

Darwin's sketch of the vegetation of the Keeling Islands[2] merits reproducing here, as it conveys a good idea of the aspect of the coral islands :—

"The cocoanut-tree at the first glance seems to compose the whole wood; there are, however, five or six other trees. One of these grows to a very large size, but from the extreme softness of its wood is useless; another sort affords excellent timber for ship-building. Besides the trees, the number of plants is exceedingly limited, and consists of insignificant weeds. In my collection, which includes, I believe, nearly the perfect flora, there are twenty species, without reckoning a moss,[3] lichen,[4] and fungus.[5] To this number two trees must be added, one of which was not in flower, and the other I only heard of. The latter is a solitary tree of its kind, and grows near the beach, where, without doubt, the one seed was thrown up by the waves. A *Guilandina* also grows on only one of the islets. I do not include in the above list the sugar-cane, banana, some other vegetables, fruit-trees, and imported grasses. As the islands consist entirely of coral, and at one time must have existed as mere water-washed reefs, all their terrestrial productions must have been transported here by the waves of the sea. In accordance with this, the florula has quite the character of a refuge for the destitute. Professor Henslow informs me that of the twenty species, nineteen belong to different genera, and these again to no less than sixteen families.

"In Holman's Travels,[6] an account is given, on the authority of Mr A. S. Keating, who resided twelve months on these islands, of the various seeds and other bodies which have been known to have been washed on shore: 'Seeds and plants from Sumatra and Java have been driven up by the surf on the windward side of the islands. Among them have been found the Kimiri, native of Sumatra and the peninsula of Malacca; the cocoanut of Balci, known by its shape and size; the

[1] DC., Prodr., xvi. 1, p. 72.

[2] Journal of Researches during the voyage of H.M.S. "Beagle," p. 454, Lond. Ed., 1879.

[3] *Hypnum fuscescens*, Hook. et Arn., not *Hypnum rufescens*, Hook., as by mistake appears in Henslow's paper. The former is a Polynesian species, while the latter inhabits Alpine situations in Europe.

[4] Not included in Henslow's paper. [5] *Polyporus lucidus*, Fries. [6] Holman's Travels, iv. p. 378.

Dadass, which is planted by the Malays with the pepper-vine, the latter entwining round its trunk, and supporting itself by the prickles on its stem; the soap-tree, the castor-oil plant, trunks of the sago-palm, and various kinds of seeds unknown to the Malays settled on the islands. These are all supposed to have been driven by the north-west monsoon to the coast of Australia, and thence to these islands by the south-east trade-wind. Large masses of Java teak and yellow wood have also been found, besides immense trees of red and white cedar, and the blue gumwood of Australia, in a perfectly sound condition. All the hardy seeds, such as creepers, retain their germinating power, but the softer kinds, among which is the mangostin, are destroyed in the passage. Fishing-canoes, apparently from Java, have at times been washed on shore.' It is interesting thus to discover how numerous the seeds are, which, coming from several countries, are drifted over the wide ocean. Professor Henslow tells me he believes that nearly all the plants which I brought from these islands are common littoral species in the East Indian Archipelago.[1] From the direction, however, of the winds and currents, it seems scarcely possible that they could have come here in a direct line. If, as suggested with much probability by Mr Keating, they were first carried towards the coast of Australia, and thence drifted back together with the productions of that country, the seeds before germinating must have travelled between 1800 and 2400 miles.

"Chamisso,[2] when describing the Radack Archipelago, situated in the western part of the Pacific, states that 'the sea brings to these islands the seeds and fruits of many trees, most of which have yet not grown here. The greater part of these seeds appear to have not yet lost the capability of growing.' It is also said that palms and bamboos from somewhere in the torrid zone, and trunks of northern firs, are washed on shore. These firs must have come from an immense distance. These facts are highly interesting. It cannot be doubted that if there were land-birds to pick up the seeds when first cast on shore, and a soil better adapted for their growth than the loose blocks of coral, that the most isolated of the lagoon islands would in time possess a far more abundant flora than they now have."

Another example of littoral vegetation in the Indian Ocean is afforded by a small collection in the Kew Herbarium from Diego Garcia in the Chagos Islands, recently contributed by A. Hume, Esq., R.N.

List of Plants from Diego Garcia, Chagos Islands.

Portulaca quadrifida, Linn.
Sida diffusa, H. B. et K.
Triumfetta procumbens, Forst.
Triphasia trifoliata, DC.
Suriana maritima, Linn.
Barringtonia speciosa, Linn.
Passiflora suberosa, Linn.
Guettarda speciosa, Linn.
Vernonia cinerea, Less.
Asclepias curassavica, Linn.
Striga hirsuta, Lour.
Stachytarpheta indica, Vahl.
Achyranthes velutina, H. et A.
Rivina lævis, Linn.
Euphorbia pilulifera, Linn.
Phyllanthus niruri, Linn. ?

The Chagos Islands are in nearly the same latitude as the Seychelles, but about eighteen degrees to the eastward of them. Whether, associated with the common plants in the above list, there is an endemic element as in Rodriguez and in the granitic Seychelles, is not known. The remarkable feature in the vegetation of the Seychelles is the number of endemic palms. Although palms exist in other oceanic islands, nowhere else in the world,

[1] A comparison with our data fully corroborates this.—W. B. H. [2] Kotzebue's First Voyage, iii. p. 155.

probably, is there so large a number of peculiar types in so small an area; there being no fewer than six monotypic genera of palms restricted to these small islands.

Most of the plants collected by Hume in Diego Garcia are also in the collections from the South-eastern Moluccas, and those which are not are all widely spread species. The only other plant we have seen from the island is an endemic fern, *Asplenium æquabile*, Baker, a distinct species sent to Kew some years ago by Lady Barkly.

In the body of the present work full details are given of the distribution of many plants which extend to Polynesia, especially such as reach the more remote islands. For purposes of comparison, and as a specimen of the botany of some of the smaller Pacific islands lying thousands of miles apart, the following lists of plants recently collected are interesting. Associated with a number of common littoral plants are a few peculiar to the region. Such are, *Lepidium piscidium*, *Heliotropium anomalum*, and *Timonius forsteri*.

List of Plants from Rarotonga, collected by Rev. W. Wyatt Gill, *communicated by* A. W. Franks, Esq.

Alphitonia excelsa, Reiss.
Inocarpus edulis, Forst.
Melastoma denticulatum, Labill.
Musssenda frondosa, Linn.
Vitex trifolia, Linn.
Ficus tinctoria, Forst. f.
Centotheca lappacea, Beauv.

List of Plants collected in the Pacific Islands by J. T. Arundel, Esq.

Lepidium piscidium, Forst.	Fanning; Starbuck; Suwarrow.
Portulaca oleracea, Linn.	Fanning.
Triumfetta procumbens, Forst.	Fanning; Suwarrow; Palmerston; Enderbury; Mary or Canton.
Sida fallax, Walp.	Fanning; Starbuck; Enderbury; Mary; Hull; Gardner.
Thespesia populnea, Corr.	Enderbury.
Tribulus cistoides, Linn.	Sydney.
Cassia occidentalis, Linn.	Fanning.
Barringtonia speciosa, Linn. f.	Ducie.
Guettarda speciosa, Linn.	Hull; Gardner.
Pemphis acidula, Forst.	Palmerston; Hull.
Asclepias curassavica, Linn.	Fanning.
Heliotropium anomalum, H. et A.	Fanning; Palmerston.
Tournefortia argentea, Linn. f.	Ducie.
Nicotiana tabacum, Linn.	Fanning.
Ipomœa grandiflora, Lam.	Fanning; Suwarrow; Enderbury; Mary; Hull; Gardner; Sydney.
Achyranthes aspera, Linn.	Fanning.
Timonius forsteri, DC.	Palmerston.
Boerhaavia tetrandra, Forst.	Fanning; Suwarrow; Enderbury; Hull; Phœnix; Mary.
Hernandia peltata, Meissn.	Not localised.
Euphorbia pilulifera, Linn.	Fanning; Suwarrow.
Ficus sp.	Fanning.
Fleurya ruderalis, Gaud. †	Fanning; Suwarrow; Enderbury; Hull; Gardner.
Lepturus repens, R. Br.	Fanning.

As every one is not familiar with the positions of the above-named islands, they may be roughly indicated, for some of the more remote ones are separated from each other by about fifty degrees of longitude and twenty-five degrees of latitude. Rarotonga, of the Hervey or Cook group, in about 160° W. longitude and 21° 5′ S. latitude, is comparatively familiar to readers of travel; Palmerston lies to the north-west in the same group. Mary, Hull, Gardner, Sydney, Phœnix, and Enderbury are in the Phœnix group, the centre of which is in about 175° W. longitude and 4° S. latitude. Fanning lies in about 4° N. and 159° W.; Starbuck in about 5° S. and 156° W.; Suwarrow in about 12° 50′ S. and 164° W.; and Ducie in about 25° S. and 125° W. The last named is, with the exception of Easter Island, the nearest to America of the southern islands of Polynesia, from which, however, it is distant more than fifty degrees.

In addition to the plants in the collection from the South-eastern Moluccas, both Wallace and Moseley mention four or five others which are characteristic of the region, and doubtless in places constitute a considerable proportion of the vegetation. They are:—Bamboo (*Bambusa* sp.), Rattans (*Calamus* spp.), Screw-pines (*Pandanus* spp.), Cocoanut (*Cocos nucifera*), and the Nipa-palm (*Nipa fruticans*); all of which, except *Cocos*, are exclusively Old World genera, or only extend to Polynesia. The apparent absence of the Bread-fruit (*Artocarpus incisa*, Forst.) in Arrou is noteworthy; inasmuch as Decaisne[1] records it from Timor. We assume it is not found in the Arrou Islands, because neither Wallace nor Moseley mentions it. Speaking of the food of the Aruese the former says:[2]—"The Aru men have no regular supply, no staff of life, such as bread, rice, mandioca, maize, or sago, which are the daily food of a large proportion of mankind. They have, however, many sorts of vegetables: yams, plantains, sweet potatoes, and raw sago; and they chew up vast quantities of sugar-cane, as well as betel-nuts, gambir, and tobacco."

Many more interesting details of the distribution of littoral plants might be adduced, but sufficient facts are embodied in these notes and in the observations under various species in the following enumeration to give a general idea of the vegetation of tropical sea-coasts, continental as well as insular. It is clear that the present general diffusion of a large proportion of the plants inhabiting the tidal forests and sandy and muddy sea-shores of the tropics is in a great measure due to oceanic currents. The wide colonisation of cultivated tropical plants is also easily accounted for, as well as that of the weeds commonly associated with them; but, eliminating the littoral, the naturalised cultivated plants, and their concomitant weeds from a flora, there remains an endemic element in the composition of the vegetation of many oceanic islands presenting problems difficult of solution, especially if their insularity has always been what it is now; but in the flora of the South-eastern Moluccas we have, so far as the present collections are concerned, no generic endemic element.

[1] Herbarii Timorensis Descriptio, p. 169. [2] Malay Archipelago, ii. p. 229.

ENUMERATION OF THE PLANTS.

PHANEROGAMÆ.—DICOTYLEDONES.

POLYPETALÆ.

RANUNCULACEÆ.

Clematis spp.

BABAR AND LARAT.—The genus is generally dispersed in temperate and tropical regions, though less common in the latter. There are two imperfect specimens of apparently different species.

Naravelia zeylanica, DC.

Naravelia zeylanica, DC.; Miq., Fl. Ind. Bat., i. 2, p. 2; Hook. f., Fl. Brit. Ind., i. p. 7.

TIMOR LAUT.—India; Himalayas and Eastern and Western Peninsulas; also in China and Java. The genus is confined to Tropical Asia.

ANONACEÆ.

Popowia filipes, n. sp.

Arbor vel *frutex*, ramulis graciliusculis junioribus ferrugineo-tomentosis. *Folia* brevissime petiolata, subcoriacea, glabra, oblonga, 2–4 poll. longa, apice rotundata vel obtuse acuminata, basi inæqualia, venis utrinque inconspicuis. *Flores* subsolitarii, gracillime pedunculati, 1½–2 lineas longi, pedunculis 4–8 lineas longis. *Sepala* 3, brevissima, late triangularia, sparse puberula. *Petala* 6, inæqualia, 3 exteriora minuta, rotundata, obtuse acuminata, subpatentia, 3 interiora ovato-oblonga, valvatim conniventia, marginibus puberulis. *Stamina* circiter 12. *Ovaria* 6, glabra, fere sessilia, uniovulata, ovulo erecto. *Carpella* globosa, sicca vix 3 lineas diametro, brevissime stipitata.

ARROU. *Moseley.*

Popowia is a small genus widely dispersed in the tropics of the Old World.

MENISPERMACEÆ.

Anamirta cocculus, Wight. et Arnott.

Anamirta cocculus, Wight. et Arnott; Hook. f., Fl. Brit. Ind., i. p. 98; Miq., Fl. Ind. Bat., i. 2, p. 78.

KI; TIMOR LAUT; DAMMAR.—Eastern Bengal, Khasia Hills, and Assam, and from Concan and Orissa to Ceylon, as well as in the Malayan Islands.

Stephania rotunda, Lour?

Stephania rotunda, Lour? Hook. f., Fl. Brit. Ind., i. p. 103.

TIMOR LAUT.—The true plant has a wide range in Continental Tropical Asia.

Cissampelos pareira, Linn.

Cissampelos pareira, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 85; Hook. f., Fl. Brit. Ind., i. p. 103; Muell., Syst. Census Austr. Pl., First Suppl., p. 3.

ARROU.—Common in nearly all tropical countries, including America; variable, and many of the forms regarded as species by some botanists. In Australia it is apparently uncommon, and has only recently been detected in the north-eastern part; and we have seen no specimens from Polynesia; but Darwin collected it in Charles and James Islands, Galapagos.

PAPAVERACEÆ.

Argemone mexicana, Linn.

Argemone mexicana, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 92; Hook. f., Fl. Brit. Ind., i. p. 117.

ARROU; LITTLE KI.—Herbaceous, and now common in almost all tropical and sub-tropical countries. Of American origin.

CRUCIFERÆ.

Brassica juncea, Hook. f. et Thoms.?

Brassica juncea, Hook. f. et Thoms.? in Hook. f., Fl. Brit. Ind., i. p. 157.

ARROU.—This species is common in Tropical Asia, where it is extensively cultivated for the oil obtained from its seeds.

CAPPARIDEÆ.

Polanisia viscosa, DC.

Polanisia viscosa, DC.; Benth., Fl. Austr., i. p. 90; Miq., Fl. Ind. Bat., i. 2, p. 97.

TIMOR LAUT.—A very common annual or biennial weed in Tropical Asia, Africa, and Australia. Colonised in the West Indies and America; but there are no Polynesian specimens in the Kew Herbarium.

Gynandropsis pentaphylla, DC.

Gynandropsis pentaphylla, DC.; Miq., Fl. Ind. Bat., i. 2, p. 97; Hook. f., Fl. Brit. Ind., i. p. 171.

ARROU; KI; TIMOR LAUT; LETTI.—Common in India and Africa, and also in America, where it is doubtfully indigenous. It is used as a pot-herb.

Cadaba sp., *Cadabæ capparoidi* aff., DC.

LETTI.—*Cadaba capparoides*, DC., is a native of Australia and Timor, and the genus is spread over Tropical Asia and Africa. The specimen is insufficient for description.

Capparis sepiaria, Linn.

Capparis sepiaria, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 101; Hook. f., Fl. Brit. Ind., i. p. 177.

Timor Laut; Wetter.—Throughout India; from the Punjab and Sindh to Birma, Pegu, the Carnatic, and Ceylon. Also in Java, the Philippines, and Timor.

Capparis spinosa, Linn. var.

Capparis spinosa, Linn., var. (*Capparis mariana*, Jacq., Hort. Schœnbr., i. t. 109; Miq., Fl. Ind. Bat., i. 2, p. 100).

Letti.—Timor and the Marianne Islands.

There is little doubt that this is an unarmed form of *Capparis spinosa*, Linn., and hardly, if at all, different from the *Capparis rupestris*, Sibth. (Flora Græca, t. 487.) Indeed, in Hooker's Flora of British India, i. p. 173, it is, judging from the distribution given of that species, regarded as a form of it, as is also the *Capparis sandwichiana*, DC. Hooker and Arnott (Botany of Beechey's Voyage, 1841, p. 59) do not actually reduce either the last named or *Capparis mariana* to *Capparis spinosa*, but they say: "This appears scarcely different from *Capparis spinosa*; nor does the *Capparis mariana* seem to us deserving of the rank of a species." On the other hand, Gray, in Wilkes's United States Exploring Expedition, Botany, i. p. 69, treats *Capparis sandwichiana* as an independent species, stating that it "is distinguished from *Capparis spinosa*, which is sometimes unarmed, by its longer petioles, only one-third shorter than the blade, and its elongated club-shaped fruit, two and a half inches long by half an inch thick, raised on a stipe three inches long." But the admitted forms of *Capparis spinosa* differ much more from each other than some of them do from the Molucca and Pacific Island form. *Capparis sandwichiana* is figured in Gaudichaud's Voyage de la Bonite, t. 55, the letterpress of which was never published. *Capparis mariana* is figured in Blanco's Flora de Filipinas, illustrated edition, ii. (1878), p. 201, t. 179, and it is there stated that it was cultivated in the Philippines, having been originally brought from the Marianne Islands. The Herbarium specimens of *Capparis sandwichiana* and *Capparis mariana* are indistinguishable, and the figure of the fruit in Blanco agrees with Gray's description, being even a little more than two and a half inches long. But the characters by which Gray thought to distinguish *Capparis sandwichiana* from *Capparis spinosa* are found to be insufficient on comparing a numerous series of specimens; those relating to the fruit equally with those relating to the leaves. In the Sandwich Islands it appears to be common now in some parts, especially on the sea-shore, and Menzies first collected it on Vancouver's voyage in 1792; and the naturalists of Beechey's voyage collected it in one of the Society Islands in 1826. Jacquin described and figured *Capparis mariana* from a plant cultivated at Schœnbrunn in 1797, which he states was sent thither from the Mauritius, though a native of the Marianne Islands. This is confirmed in a measure by Bojer's Hortus Mauritianus. Allan

Cunningham collected it in 1818 in Timor, where he found it by roadsides and on walls. In Hooker's Flora of British India it is said to occur in Australia; but this is an error, which arose no doubt through Cunningham's plant being prominently labelled Australian Herbarium.

With regard to the origin of the insular plant, it seems highly probably that it was introduced by the Spaniards at an early date, for we have evidence that the buds and fruits are used in the same way as in Europe, and it consequently would be conveyed from island to island purposely and accidentally. In North-western India, Zanzibar, and Eastern Tropical Africa grows a variety of *Capparis spinosa*, namely, *Capparis galeata*, which has even larger flowers and fruit than the insular plant; so that altogether the affinities of this plant seem to be indisputable, though its Mediterranean origin cannot be proved.

Capparis sp., *Capparis lasiopodæ* et *pubifloræ* aff.

Timor Laut.—Specimen fragmentary and insufficient for determination, though it is clearly allied to the above named species from the same region. There are imperfect specimens of two or three other species of *Capparis* from Timor Laut, Dammar, and other islands, closely allied to, if not the same, as *Capparis lucida*, R. Br., and *Capparis salaccensis*, Bl. The former is a native of North Australia and Queensland, and the latter of Java.

VIOLARIEÆ.

Ionidium suffruticosum, Ging.

Ionidium suffruticosum, Ging.; Benth., Fl. Austr., i. p. 101; Miq., Fl. Ind. Bat., i. 2, p. 115 (*frutescens*).

Timor Laut.—Widely spread in Tropical Asia, Africa, and the eastern parts of Australia.

PITTOSPOREÆ.

Pittosporum revolutum, Ait.?

Pittosporum revolutum, Ait.? Benth., Fl. Austr., i. p. 111.

Ki.—The typical plant inhabits Victoria, New South Wales, and Queensland. There is a specimen of a second species from Timor Laut. Altogether there are about fifty species of this genus, which is generally spread over the warmer parts of Asia, Africa, Australia, the Pacific Islands, and New Zealand.

POLYGALEÆ.

Polygala sp.

Ki.—Probably an undescribed species, but as there are many Archipelago species, of which we have seen no authentic specimens, we will not venture to give it a name. The genus is generally spread in tropical and most temperate countries, but it is wanting altogether in New Zealand, and only one species extends into temperate Australia.

PORTULACEÆ.

Portulaca oleracea, Linn.

Portulaca oleracea, Linn.; Benth., Fl. Austr., i. p. 169.

Arrou; Timor Laut. Common, especially in maritime districts, in tropical and subtropical regions generally, including the most remote islands and islets, being apparently one of the first plants to establish itself on coral islands.

GUTTIFERÆ.

Garcinia sp.

Dammar.—The Guttiferæ are strongly represented in Tropical Asia, including the Archipelago; and the genus *Garcinia*, which comprises about sixty-five species, is almost confined to this area, a few species only occurring in Africa and Polynesia. *Garcinia timorensis* (Spanog. in Linnæa, xv. p. 178) we have not seen. There are no published species from Australia, but in the Kew Herbarium there are specimens of one species from Cape York Peninsula. With this exception, and one or two species of *Calophyllum*, no other members of the order are known to inhabit Australia.

Ochrocarpus ovalifolius, T. And.

Ochrocarpus ovalifolius, T. And., MSS. in Herb. Kew.
Calysaccion obovale, Miq., Fl. Ind. Bat. Suppl., i. pp. 194 et 500.

Timor Laut.—Originally described from specimens from Pulu Sangian, an island in the Sunda Straits. Mr Moseley collected it in Observatory Island, one of the Admiralty group. It is the tree alluded to in the Journal of the Linnean Society of London, xv. p. 75, under the name of *Calophyllum inophyllum*, as growing close to and overhanging the sea, the bases of many of the trunks being almost constantly washed by the waves. The genus comprises about six species, three or four of which are Asiatic, and the others inhabit Madagascar and Africa.

Calophyllum inophyllum, Linn.

Calophyllum inophyllum, Linn.; Benth., Fl. Austr., i. p. 183; Hook., Fl. Brit. Ind., i. p. 273; Miq., Fl. Ind. Bat., i. 2, p. 510; Seem., Fl. Vit., p. 12; Nadeaud, Enum. Pl. Tahiti, p. 69; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 101; Mann in Proc. Amer. Acad., vii. p. 156.

Arrou; Ki; Timor Laut; Larat.—An exceedingly common sea-shore tree in Polynesia, the Mascarene Islands, India, and the Indian Archipelago. Though growing chiefly in maritime districts, it succeeds perhaps almost equally well inland, and is cultivated throughout India.

DIPTEROCARPEÆ.

Vateria papuana, Dyer MSS. (Plate LXIV. B.)

Vatica papuana, Dyer in Journ. Bot., 1878, p. 100.

Arrou.—Also from Ramoi, Southern New Guinea, and in the New Guinea drift. For further particulars concerning this tree see above in the enumeration of the seeds and seed-vessels in the New Guinea drift.

MALVACEÆ.

Sida rhombifolia, Linn.

Sida rhombifolia, Linn.; Benth., Fl. Austr., i. p. 196; Miq., Fl. Ind. Bat., i. 2, p. 142; Hook. f., Fl. Brit. Ind., i. p. 323.

Timor Laut.—A generally diffused shrub or half-shrub, in warm countries of both hemispheres. It is variable, and several forms have been described as species.

Sida carpinifolia, Linn.

Sida carpinifolia, Linn.; Hook. f., Fl. Brit. Ind., i. p. 323; Miq., Fl. Ind. Bat. i. 2, p. 143 (*Sidá stauntoniana*).

Arrou; Timor Laut.—A very widely diffused herb in warm countries, yet it is not known to inhabit Australia or Polynesia.

Sida humilis, Willd.

Sida humilis, Willd.; Hook. f., Fl. Brit. Ind., i. p. 322; Miq., Fl. Ind. Bat., i. 2, p. 139.

Timor Laut.—A widely spread weed in Tropical Asia, Africa, and America, but hitherto not found in Australia.

Abutilon indicum, Don.

Abutilon indicum, Don; Benth., Fl. Austr., i. p. 202; Miq., Fl. Ind. Bat., i. 2, p. 146; Hook. f., Fl. Brit. Ind., i. p. 326; Griseb., Fl. Brit. W. Ind., p. 78, *partim*.

Timor Laut; Letti.—Widely spread in Tropical Asia, Africa, and Australia, and

common, according to Miquel, in all the Molucca Islands. Bentham unites *Abutilon asiaticum*, Don, with this; but it is retained as a distinct species in the Flora of British India.

Abutilon graveolens, Wight et Arn.

Abutilon graveolens, Wight et Arn.; Hook. f., Fl. Brit. Ind., i. p. 327; Benth., Fl. Austr., i. p. 204; Miq., Fl. Ind. Bat., i. 2, p. 145 (*Abutilon hirtum*).

Timor Laut.—Tropical Asia, Africa, and Australia; and Grisebach, who treats this as a variety of *Abutilon indicum*, records it from the West Indies (Fl. Brit. W. Ind., p. 78).

Urena lobata, Linn.

Urena lobata, Linn.; Benth., Fl. Austr., i. p. 206; Miq., Fl. Ind. Bat., i. 2, p. 148; Hook. f., Fl. Brit. Ind., i. p. 329; Nadeaud, Enum. Pl. Tahiti, p. 67; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 99; Seem., Fl. Vit., p. 16.

Timor Laut.—A common herb in all tropical regions, exhibiting great variability in nearly all parts of its range.

Hibiscus rosa-sinensis, Linn.

Hibiscus rosa-sinensis, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 156; Hook. f., Fl. Brit. Ind., i. p. 344; Nadeaud, Enum. Pl. Tahiti, p. 67; Seem., Fl. Vit., p. 16; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 94.

Ki.—Cultivated in Java and Timor, and throughout India, according to Hooker. It is found in many of the Pacific Islands, as well as China and Cochin-China, where it may be indigenous.

Hibiscus surattensis, Linn.

Hibiscus surattensis, Linn.; Hook. f., Fl. Brit. Ind., i. p. 334; Miq., Fl. Ind. Bat., i. 2, p. 161; Oliver, Fl. Trop. Afr., i. p. 201.

Timor Laut.—Timor, through the Archipelago to the Philippine Islands, and Penang to Bengal, and common in Tropical and South Africa. Though recorded from Australia, both in the Flora of Tropical Africa and the Flora of British India, we have seen no specimens, and suspect it to be an error.

Hibiscus tetraphyllus, Roxb.

Hibiscus tetraphyllus, Roxb.; Hook. f., Fl. Brit. Ind., i. p. 341.

Timor Laut.—This annual herb has a wide range in India; but we have seen no other specimens from the Archipelago.

Hibiscus vitifolius, Linn.

Hibiscus vitifolius, Linn.; Benth., Fl. Austr., i. p. 215; Hook. f., Fl. Brit. Ind., i. p. 338; Miq., Fl. Ind. Bat., i. 2, p. 160.

Moa.—Widely dispersed in the tropics of the Old World, and naturalised in the West Indies. It is a herbaceous species readily distinguished by its winged capsules.

Hibiscus virgatus, Blume.

Hibiscus virgatus, Blume; Miq., Fl. Ind. Bat., i. 2, p. 156.

Timor Laut.—Also from Timor and Java.

Hibiscus tiliaceus, Linn.

Hibiscus tiliaceus, Linn.; Benth., Fl. Austr., i. p. 218; Miq., Fl. Ind. Bat., i. 2, p. 153; Hook. f., Fl. Brit. Ind., i. p. 343; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 94; Seem., Fl. Vit., p. 18.

Paritium tiliaceum, Adr. Juss. in St. Hilaire Fl. Bras. Merid., i. p. 256.

Letti; Babar.—One of the most generally dispersed sea-coast trees in the tropics and some subtropical countries, and particularly abundant in Polynesia and other Pacific Islands, including the Sandwich and Galapagos, often growing within reach of the ordinary tides. It is one of the score or so of flowering plants collected in the Keeling Islands by the late Charles Darwin. Among other localities we have seen specimens from Pitcairn Island. Though naturally a maritime tree, it ascends the rivers to considerable distances, and is often planted inland on account of its ornamental aspect.

Thespesia populnea, Corr.

Thespesia populnea, Corr.; Benth., Fl. Austr., i. p. 221; Hook. f., Fl. Brit. Ind., i. p. 345; Miq., Fl. Ind. Bat., i. 2, p. 150; Seem., Fl. Vit., p. 18; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 96 (*Hibiscus*).

Arrou; Dammar; Timor Laut.—A common sea-shore tree in the tropics of the Old World, and especially abundant in Polynesia. Forster, on Cook's second voyage, collected it in Easter Island. It is naturalised in the West Indies. Seemann, in Kittlitz's Views of the Vegetation of the Pacific (English edition), p. 22, enumerates the following as some of the principal trees immediately succeeding the mangroves:—*Barringtonia speciosa*, *Calophyllum inophyllum*, *Hibiscus tiliaceus*, and *Thespesia populnea*. Jouan mentions that *Thespesia populnea* is somewhat rare in the Marquesas, and only met with on the sea-shore where the waves could have conveyed the seeds. This tree does not occur in the Sandwich Islands.

Thespesia lampas, Dalz. et Gibs.

Thespesia lampas, Dalz. et Gibs.; Hook. f., Fl. Brit. Ind., i. p. 345; Oliver, Fl. Trop. Afr., i. p. 209.

Thespesia macrophylla, Blume; Miq., Fl. Ind. Bat., i. 2, p. 151?

Timor Laut.—Common in India, and apparently throughout the Archipelago, but not

known to inhabit Australia or Polynesia; and the African specimens referred to this species are doubtful.

Gossypium barbadense, Linn.

Gossypium barbadense, Linn.; Hook. f., Fl. Brit. Ind., i. p. 347; Oliver, Fl. Trop. Afr., i. p. 210; Seem., Fl. Vit., p. 21.
Gossypium vitifolium, Lam.; Miq., Fl. Ind. Bat., i. 2, p. 163.

TIMOR LAUT.—Generally diffused in hot countries as an escape from or the remains of cultivation. The varieties of this species furnish the so-called American cotton.

Gossypium herbaceum, Linn.

Gossypium herbaceum, Linn.; Hook. f., Fl. Brit. Ind., i. p. 346; Oliver, Fl. Trop. Afr., i. p. 211; Miq., Fl. Ind. Bat., i. 2, p. 162 (*Gossypium indicum* et *Gossypium micranthum*).

TIMOR LAUT.—Now widely diffused in warm countries. *Gossypium stocksii*, Masters in Hook. f. Fl. Brit. Ind., i. p. 346, is probably the wild parent of the forms usually referred to this species.

Bombax insigne, Wall. ?

Bombax insigne, Wall., Pl. Asiat. Rar., p. 71, tt. 79, 80? Hook. f., Fl. Brit. Ind., i. p. 349.

TIMOR LAUT.—It is uncertain whether the Timor Laut specimen belongs to the present species, or to the commoner Indian *Bombax malabaricum*, which has also been found in North Australia. There is one different species in Tropical Africa, and several in America. Miquel does not include the genus, and there are no other Archipelago specimens in the Kew Herbarium.

STERCULIACEÆ.

Sterculia fœtida, Linn.

Sterculia fœtida, Linn.; Benth., Fl. Austr., i. p. 226; Hook. f., Fl. Brit. Ind., i. p. 354; Miq., Fl. Ind. Bat., i. 2, p. 172.

LAKOR; TIMOR LAUT.—Tropical Australia; throughout the Indian Archipelago, India, including the Western Peninsula, and Eastern Tropical Africa. A large tree common in the Moluccas. Two other species of *Sterculia* were collected in Timor Laut and Ki Island; one of them is apparently *Sterculia balanghas*, a common Indian species. The genus is a large one, and spread over all tropical countries, but most numerous in species in Asia, where it extends into temperate regions in China and Japan. *Sterculia vitiensis*, Seem. (Fl. Vit., p. 23), is very closely allied to *Sterculia fœtida*.

Heritiera littoralis, Dryander.

Heritiera littoralis, Dryander; Miq., Fl. Ind. Bat., i. 2, p. 179; Hook. f., Fl. Brit. Ind., i. p. 363 (excl. syn. *Heritiera macrophylla*); Benth., Fl. Austr., i. p. 231; Oliver, Fl. Trop. Afr., i. p. 225; Seem., Fl. Vit., p. 23.

ARROU.—A seaside tree throughout Tropical Asia; in Northern Australia, the Fiji and Tongan Islands, and Eastern Tropical Africa. The large carpels float, and Mr Moseley picked up some on the beach at Arrou, but no specimens of the foliage or flowers.

Kleinhovia hospita, Linn.

Kleinhovia hospita, Linn.; Hook. f., Fl. Brit. Ind., i. p. 364; Miq., Fl. Ind. Bat., i. 2, p. 186; Oliver, Fl. Trop. Afr., i. p. 226; Seem., Fl. Vit., p. 24.

TIMOR LAUT; BABAR; WETTER.—Common in the Archipelago and India, as well as in the Fiji and Society Islands; also occurring in the Mascarene Islands and the islands of Eastern Tropical Africa, but not known to grow in Australia nor on the mainland of Africa. Naturalised in the West Indies. A handsome tree, generally growing gregariously, according to Seemann.

Helicteres isora, Linn.

Helicteres isora, Linn.; Benth., Fl. Austr., i. p. 232; Miq., Fl. Ind. Bat., i. 2, p. 169; Hook. f., Fl. Brit. Ind., i. p. 365.

LETTI.—Throughout the Archipelago and India, common; but only found in the extreme north of Australia, and not recorded from Polynesia. A considerable genus widely spread in the tropics, and most numerously represented in America, but apparently absent from Africa.

Melhania n. sp. ?

TIMOR LAUT.—This species is allied to the Indian *Melhania tomentosa*. The genus consists of about twenty species in Tropical Asia and Africa, one of the Asiatic species occurring in Australia; and there are two very distinct species in St Helena, which are sometimes referred to *Trochetia*, which they more closely resemble in habit.

Melochia velutina, Bedd.

Melochia velutina, Bedd.; Hook. f., Fl. Brit. Ind., i. p. 374.
Riedleia tiliæfolia, DC., Prodr., i. p. 490; Miq., Fl. Ind. Bat., i. 2, p. 188.

KI; LETTI; TIMOR LAUT.—Timor and northward into the hotter parts of India, though often only planted. *Melochia* numbers upwards of fifty species, spread nearly all over the warmer regions of both hemispheres.

Melochia odorata, Forst.

Melochia odorata, Forst., Fl. Ins. Austr. Prodr., p. 47.
Riedleia odorata, DC., Prodr., i. p. 491.
Melochia vitiensis, A. Gr.; Seem., Fl. Vit., p. 24?

Dammar; Timor Laut.—New Caledonia; New Hebrides; Fiji Islands; Samoa.

TILIACEÆ.

Brownlowia riedelii, n. sp.

Brownlowiæ elatæ affinis, differt foliis cordata-ovatis crassioribus, subtus minute lepidotis, supra nitidis, basi 5-nervosis, petiolis longioribus, floribus duplo minoribus.

Wetter.—This species is readily distinguished from its nearest ally by the characters given. *Brownlowia elata* has rotundate leaves, seven-nerved at the base, clothed with very short pale brown hairs beneath, and the upper surface much less polished; and the flowers, with a whitish calyx, are at least double the size of this species. In floral structure there is no essential difference. The fruit of *Brownlowia riedelii* is unknown. Altogether four species are described, and the genus is restricted to India and the Archipelago.

In the Flora of British India, *Brownlowia peltata*, Benth. (Journ. Linn. Soc. Lond. v. Suppl., p. 56), is confounded by Masters with *Brownlowia elata*. The former was originally described from Bornean specimens, but it is also found in Mergui and other parts of the Malayan Peninsula. It is easily recognised by its peltate leaves on very long petioles.

Triumfetta rhomboidea, Jacq.

Triumfetta rhomboidea, Jacq.; Hook. f., Fl. Brit. Ind., i. p. 395; Oliver, Fl. Trop. Afr., i. p. 257; Miq., Fl. Ind. Bat., i. 2, p. 197 (*Triumfetta angulata*, Lam.)

Timor Laut.—Common in Tropical Asia, and generally dispersed in Tropical Africa; also occurring in Tropical America. The seed-vessel of this species is covered with hooked prickles. It is very variable in its foliage, the same variations being repeated in different parts of its area.

Triumfetta annua, Linn.

Triumfetta annua, Linn.; Hook. f., Fl. Brit. Ind., i. p. 396; Miq., Fl. Ind. Bat., i. 2, p. 196.

Timor Laut.—Throughout Tropical Asia and Africa. This also has the seed-vessel furnished with hooked prickles. A third, undetermined, species of this genus was collected in Timor Laut. *Triumfetta procumbens*, Forst., is a seaside species common in Polynesia, and in some islands of the Malayan Archipelago and Indian Ocean, also occurring on maritime sands in North-eastern Australia. In the Kew Herbarium there are specimens from Diego Garcia, Chagos Islands, Indian Ocean, and from several remote islands of Polynesia, such as Fanning, Suwarrow, and Enderbury.

Corchorus olitorius, Linn.

Corchorus olitorius, Linn.; Hook. f., Fl. Brit. Ind., i. p. 397; Miq., Fl. Ind. Bat., i. 2, p. 195; Benth., Fl. Austr., i. p. 276; Oliver, Fl. Trop. Afr., i. p. 262.

TIMOR LAUT.—Often cultivated as a pot-herb, as well as for the fibres of its stem, and found in a wild state throughout the tropics.

Corchorus acutangulus, Lam.

Corchorus acutangulus, Lam.; Miq., Fl. Ind. Bat., i. 2, p. 194; Benth., Fl. Austr., i. p. 277; Hook. f., Fl. Brit. Ind., i. p. 398.

TIMOR LAUT.—Generally dispersed in the tropics of the Old World, and occurring in some parts of South America, where, however, it may have been introduced.

Corchorus trilocularis, Linn.

Corchorus trilocularis, Linn.; Hook. f., Fl. Brit. Ind., i. p. 397; Oliver, Fl. Trop. Afr., i. p. 262; Muell., Syst. Census Austr. Pl., p. 17.

TIMOR LAUT.—Common in Tropical Asia and Africa, but only recorded from Queensland in Australia.

MALPIGHIACEÆ.

Ryssopterys timorensis, Blume.

Ryssopterys timorensis, Blume; Miq., Fl. Ind. Bat., i. 2, p. 584; Benth., Fl. Austr., i. p. 285.

WETTER.—Northern Australia, New Caledonia, and New Guinea to the Philippines and Java. Seed-vessel winged like that of the Sycamore. There are several other species in the Indian Archipelago.

Tristellateia australasica, A. Rich.

Tristellateia australasica, A. Rich; Benth., Fl. Austr., i. p. 286; Hook. f., Fl. Brit. Ind., i. p. 418; Miq., Fl. Ind. Bat., i. 2, p. 585.

ARROU; KI; TIMOR LAUT.—North Australia, through New Guinea and the Archipelago to Singapore. Fruit winged.

ZYGOPHYLLEÆ.

Tribulus cistoides, Linn.

Tribulus cistoides, Linn.; Benth., Fl. Austr., i. p. 288; Hook. f., Fl. Brit. Ind., i. p. 423; H. Mann in Proc. Amer. Acad., vii. p. 158.

KI; TIMOR LAUT.—Common in Tropical Australia, Sandwich Islands, and many parts of America; rarer in Tropical Asia and Africa. Seemann does not mention it in his Flora Vitiensis, and it does not appear to reach any of the South Pacific Islands. Seed-vessel furnished with spines.

GERANIACEÆ.

Averrhoa carambola, Linn.

Averrhoa carambola, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 133; Hook. f., Fl. Brit. Ind., i. p. 439.

Timor Laut.—Common throughout the Archipelago, and in India; but it is extensively cultivated, and believed to have been originally introduced from America.

Impatiens sp.

Ki.—The genus *Impatiens*, so numerous in India, is represented by few species in the Archipelago, and not at all in Australia. One species occurs in Timor. The specimen is insufficient for determining the species.

RUTACEÆ.

Glycosmis pentaphylla, Corr., var.

Glycosmis pentaphylla, Corr., var.; Hook. f., Fl. Brit. Ind., i. p. 499; Miq., Fl. Ind. Bat. i. 2, p. 522; Benth., Fl. Austr., i. p. 367.

Arrou; Ki; Timor Laut; Babar.—An exceedingly variable shrub or tree, generally spread in Tropical Asia, and occurring in Northern Australia. Fruit a small berry.

Micromelum pubescens, Blume.

Micromelum pubescens, Blume; Benth., Fl. Austr., i. p. 368; Hook. f., Fl. Brit. Ind., i. p. 501; Oliv. in Journ. Linn. Soc. Lond. v. Suppl., p. 40.
Micromelum minutum, Seem., Fl. Vit., p. 31.

Ki; Timor Laut; Dammar.—Common in Tropical Australia and Eastern Polynesia, and through the Archipelago to India and China. Seemann states that he thinks the Australian and Polynesian plant is a distinct species. It is found in North-eastern Australia, New Caledonia, and the Friendly and Fiji Islands. The genus comprises two other species which inhabit the Archipelago.

Murraya exotica, Linn. var.

Murraya exotica, Linn. var.; Benth., Fl. Austr., i. p. 369; Miq., Fl. Ind. Bat., i. 2, p. 522; Hook. f., Fl. Brit. Ind., i. p. 502.

Timor Laut; Babar.—North Australia and New Hebrides, to India, from Bengal to the north-west. Commonly cultivated for its sweet-scented flowers. There are several varieties. *Murraya* is a small genus restricted to the area of the present species.

Atalantia nitida, Oliv. var.

Atalantia nitida, Oliv. var.; Journ. Linn. Soc. Lond. v. Suppl., p. 25.

Timor Laut.—The typical form inhabits the Philippines. The genus consists of about ten Asiatic and one Australian species.

Citrus, sp.

KI.—The cultivated and wild species and varieties are numerous in the Archipelago, and two occur in Tropical Australia.

SIMARUBEÆ.

Suriana maritima, Linn.

Suriana maritima, Linn.; Benth., Fl. Austr., i. p. 375; Miq., Fl. Ind. Bat., i. 2, p. 619; Hook. f., Fl. Brit. Ind., i. p. 522; Seem., Fl. Vit., p. 34; Nadeaud, Enum. Pl. Tahiti, p. 75.

TIMOR LAUT.—A monotype and one of the most widely diffused of seaside shrubs, being found on nearly all tropical shores, insular and continental, where there is vegetation. In the Atlantic it is found as far north as the Bermudas. It is apparently somewhat rare in the Pacific, for Seemann did not meet with it in the Fijis, and it is not included in Mann's list of Sandwich Island plants. Nadeaud states that it is no longer met with in Tahiti, where it formerly existed, though in some of the adjacent islets it is still abundant. Nevertheless, he designates it a representative of the madreporic vegetation. The only Polynesian specimens in the Kew Herbarium are from the Friendly Islands (Menzies), Tahiti (Hinds), Bow Island, Dangerous Archipelago (Barclay), and Funafuti, Ellice group (Whitmee). The last named collector, who visited many islands of the Samoan, Phœnix, Ellice, and Gilbert groups, records on his label that Funafuti was the only island on which he met with it.

Harrisonia brownii, Juss.

Harrisonia brownii, Juss.; Benth., Fl. Austr., i. p. 376; Miq., Fl. Ind. Bat., i. 2, p. 677.

LAKOR; TIMOR LAUT.—Northern Australia, Timor, and the Philippines, and probably in some of the intervening islands.

MELIACEÆ.

Dysoxylon, n. sp. ?

ARROU; TIMOR LAUT.—There are imperfect specimens of three species, apparently belonging to this genus, which ranges all over Tropical Asia, extending southward to New Zealand.

Aglaia elæagnoides, Benth.

Aglaia elæagnoides, Benth., Fl. Austr., i. p. 383.

KI; TIMOR LAUT.—North Australia, New Caledonia, New Hebrides, New Guinea, and the Celebes. *Aglaia* is a small genus spread over the Archipelago, and extending to Polynesia and Australia.

Owenia cerasifera, F. Muell. ?

Owenia cerasifera, F. Muell. ? Benth., Fl. Austr., i. p. 386.

TIMOR LAUT.—There is some doubt whether the insular specimens belong to this species, which is not well defined. Previously the genus was only known from Tropical and Subtropical Australia, where there are about half a dozen species.

Carapa moluccensis, Lam.

Carapa moluccensis, Lam.; Benth., Fl. Austr., i. p. 387; Hook. f., Fl. Brit. Ind., i. p. 567; Oliver, Fl. Trop. Afr., i. p. 337; Seem., Fl. Vit., p. 38.
Xylocarpus granatum, Kœnig.; Miq., Fl. Ind. Bat., i. 2, p. 546.

TIMOR LAUT.—A tree or large shrub found on most muddy sea-shores from Northern Australia through the Archipelago to India and Ceylon; also in Madagascar and on the east coast of Tropical Africa. It extends eastward as far as the Fiji Islands. The seeds of this tree are large and very light, having a thick spongy or fibrous testa. Mr Moseley's collection of drift seeds includes this. *Carapa guianensis* inhabits the West Indies, Guiana, and Senegambia, and there are two or three other Asiatic species.

OLACINEÆ.

Cardiopteris lobata, R. Br.

Cardiopteris lobata, R. Br.; Hook. f., Fl. Brit. Ind., i. p. 597; Miq., Fl. Ind. Bat., i. 1, p. 798.

TIMOR LAUT.—The only species, ranging from New Guinea and Ceram to Western China and Eastern India. In Java the leaves are eaten as a vegetable. The indehiscent seed-vessel is light and broadly winged. Besides this, which is of anomalous structure, two or three other members of this Order were collected in the South-eastern Moluccas. Thus a species of *Gomphandra?* in Arrou, and a *Strombosia?* in Timor Laut; both very imperfect specimens.

Ximenia americana, Linn.

Ximenia americana, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 786; Benth., Fl. Austr., i. p. 391; Hook. f., Fl. Brit. Ind., i. p. 574.
Ximenia elliptica, Forst.; Seem., Fl. Vit., p. 39; Nadeaud, Enum. Pl. Tahiti, p. 70.

TIMOR LAUT.—Maritime districts throughout the tropics of both hemispheres. The fruit is eaten. Seemann states that the Pacific Island plant is always unarmed, and he retains it as an independent species. Nadeaud relates that this shrub is pseudo-parasitical, and that it had become very rare in Tahiti itself, although still abundant in some of the neighbouring islets. He classes it with the true madreporic plants. The few other species of *Ximenia* are American or African.

CELASTRINEÆ.

Euonymus javanicus, Blume.

Euonymus javanicus, Blume; Horsf., Pl. Jav., p. 13, t. 28; Miq., Fl. Ind. Bat., i. 2, p. 588, *β timorensis*, Zipp.

ARROU.—Also in Timor; the typical form is common in Java.

Gymnosporia montana, Benth. ?

Gymnosporia montana, Benth.? Fl. Austr., i. p. 400, Hook. f., Fl. Brit. Ind., i. p. 621; Oliver, Fl. Trop. Afr., i. p. 361 (*Celastrus senegalensis*, Lam.)

TIMOR LAUT.—A very variable species, ranging from Australia to North-western India, and also widely dispersed in Tropical Africa. *Gymnosporia* is widely spread in the warmer regions of the Old World, extending to the Pacific Islands and South-western Europe.

Hippocratea grahami, Wight?

Hippocratea grahami, Wight? Hook. f., Fl. Brit. Ind., i. p. 624.

TIMOR LAUT.—The species is doubtful. *Hippocratea* is a large genus, generally spread in the tropics. There is also a doubtful species of the allied genus *Salacia*, perhaps *Salacia patens*, Dene., from Timor Laut. *Hippocratea grahami* inhabits the Indian Peninsula from Concan southward, and perhaps also Assam and Silhet.

RHAMNEÆ.

Smythea pacifica, Seem.

Smythea pacifica, Seem., Fl. Vit., p. 41, t. 11.

ARROU.—Fiji and Admiralty Islands, and perhaps also New Guinea and Timor Laut, for *Smythea novoguineensis*, Scheff., does not appear to be different. The genus was founded on this species, and two others are known to inhabit the Malayan Peninsula.

Alphitonia excelsa, Reiss. var.

Alphitonia excelsa, Reiss. var.; Benth., Fl. Austr., i. p. 414; Seem., Fl. Vit., p. 43.

TIMOR LAUT.—Tropical Australia, and common throughout the Fiji Islands; also collected in the Society, Tongan, and Samoan Islands, and in New Caledonia. Perhaps also in Borneo and the Philippines; or, if not the same species, a very closely allied one. As limited by Bentham and Seemann, the species is a very variable one, and several of the forms have been described as species. Mr Bentham suggests that there is only one species. It is a tree of considerable size, yielding a useful timber.

Gouania microcarpa, DC.

Gouania microcarpa, DC.; Miq., Fl. Ind. Bat., i. 1, p. 650; Hook. f., Fl. Brit. Ind., i. p. 643; Seem., Fl. Vit., p. 43.

TIMOR LAUT.—Java, Malacca, and the Western Peninsula of India. *Gouania richii*, A. Gr., of the Fiji Islands, is very near this. The genus is generally diffused in the tropics, except Australia.

AMPELIDEÆ.

Vitis repens, Wight and Arnott.

Vitis repens, Wight and Arnott; Hook. f., Fl. Brit. Ind., i. p. 646.
Cissus repens, Lam.; Miq., Fl. Ind. Bat., i. 2, p. 605.

TIMOR LAUT.—Amboina and Java, and almost all over India. According to Miquel, the leaves are employed as an acidulant.

Vitis tenuifolia, Wight and Arnott?

Vitis tenuifolia, Wight and Arnott? Hook. f., Fl. Brit. Ind., i. p. 660.

TIMOR LAUT.—Nearly all over India, and also in China and Japan. Fragments of several other species of *Vitis* were collected in Arrou, Maru, Timor Laut, &c.

Leea sambucina, Willd. var.?

Leea sambucina, Willd. var.? Benth., Fl. Austr., i. p. 451; Miq., Fl. Ind. Bat., i. 2, p. 611; Hook. f., Fl. Brit. Ind., i. p. 666; Seem., Fl. Vit., p. 44.

ARROU; DAMMAR.—This handsome shrub is generally diffused in Tropical Asia, Africa, Australia, and the Fiji Islands. Fruit a berry, as in *Vitis*. *Leea* is peculiar to the Old World.

Leea æquata, Linn.

Leea æquata, Linn., Mant., p. 124; C. B. Clarke in Journ. Bot., 1881, p. 163.

ARROU; KI; BABAR; DAMMAR; TIMOR LAUT.—A very common species in Eastern Tropical India and Malaya.

SAPINDACEÆ.

Erioglossum edule, Blume.

Erioglossum edule, Blume; Miq., Fl. Ind. Bat., i. 2, p. 574; Benth., Fl. Austr., i. p. 454; Hook. f., Fl. Brit. Ind., i. p. 672.

TIMOR LAUT.—Northern Australia, and generally spread in Tropical Asia. Miquel states that the fruit of this large tree is eaten in the Archipelago. *Erioglossum* is a small genus limited to the tropics of the Old World.

Allophylus cobbe, Blume, var.

Allophylus cobbe, Blume, var.; Hook. f., Fl. Brit. Ind., i. p. 673.
Allophylus timorensis, sundanus, &c., Miq., Fl. Ind. Bat., i. 2, p. 575.
Schmidelia serrata, DC.; Benth., Fl. Austr., i. p. 455.
Schmidelia cobbe, DC., Prodr., i. p. 610.

ARROU; KI; TIMOR LAUT.—This tree is spread all over Tropical Asia, and has also been found in Northern Australia. It is exceedingly variable, and upwards of a score of the forms have been proposed as species under the generic names of *Ornitrophe*, *Schmidelia*, *Allophylus*, &c., so that its synonymy is very copious.

Schmidelia sp.

ARROU.—This is probably one of the described species, but they are very difficult to determine from incomplete specimens. Genus spread all over the tropics, with the greatest concentration of species in America.

Cupania spp.

KI; TIMOR LAUT.—There are indifferent specimens of three or four species of this generally dispersed genus of tropical trees and shrubs.

Atalaya sp. ?

TIMOR LAUT.—With the exception of one from Timor, all the described species of this genus are endemic in Tropical and Subtropical Australia.

Schleichera trijuga, Willd.

Schleichera trijuga, Willd.; Hook. f., Fl. Brit. Ind., i. p. 681; Miq., Fl. Ind. Bat., i. 2, p. 573.

LETTI; WETTER; TIMOR LAUT.—A large tree spread all over Tropical Asia, and commonly planted in the lower region in the Archipelago, according to Miquel, for its juicy, fleshy fruit.

Dodonæa viscosa, Linn.

Dodonæa viscosa, Linn.; Benth., Fl. Austr., i. p. 475; Hook. f., Fl. Brit. Ind., i. p. 697; Seem., Fl. Vit., p. 49.
Dodonæa angustifolia, Linn. f., Suppl. Pl., p. 218; Miq., Fl. Ind. Bat., i. 2, p. 580.

LAKOR; LARAT; MOA; TIMOR LAUT.—This species grows almost everywhere in tropical and subtropical regions, and also extends into temperate countries, both north and south. It is very variable, and the extreme forms are very different, but they are connected by every possible intermediate gradation. Mr Bentham (*loc. cit.*) says:—"It includes probably the whole of the extra-Australian described species, except, perhaps, the *Dodonæa*

eriocarpa from the Sandwich Islands, *Dodonæa thunbergiana* from South Africa, and one or two Mexican ones, which, whether varieties or species, do not occur in Australia. Whatever the rank of these forms, they all belong to the same type, which is also abundantly represented in Australia, where there are upwards of forty other species, exhibiting a great diversity in their foliage, flowers, and fruits, though many of them are difficult of discrimination. One large section has pinnate leaves, while in others they are long and slender like those of a pine, or short and slender like those of a heath.

Dodonæa viscosa is one of those plants that thrive on the sea-coast as well as inland, and in almost any soil or situation.

ANACARDIACEÆ.

Mangifera spp.

LETTI; TIMOR LAUT.—Specimens of two or three species of this essentially Malayan genus were collected, but they have not been identified. *Mangifera indica*, the Mango, a native of Tropical India, is commonly cultivated there as well as in other hot countries.

Buchanania angustifolia, Roxb. var. ?

Buchanania angustifolia, Roxb. var.? Hook. f., Fl. Brit. Ind., ii. p. 23; Benth., Fl. Austr., i. p. 490.

ARROU.—As limited by Mr Bentham, *Buchanania angustifolia* would perhaps include this plant; but Sir Joseph Hooker states that the Malayan and Australian forms present some essential differences.

Buchanania arborescens, Blume?

Buchanania arborescens, Blume? Miq., Fl. Ind. Bat., i. 2, p. 636.

BABAR.—The typical form is restricted to the Archipelago, and the present one may be specifically different. There is a third undetermined species collected in Arrou by Mr Moseley. The genus is almost exclusively restricted to Tropical Asia, one species only being known from Australia, and one or two from the Fiji Islands.

Semecarpus heterophyllus, Blume.

Semecarpus heterophyllus, Blume; Miq., Fl. Ind. Bat., i. 2, p. 625.

TIMOR LAUT.—This may be different from the Java and Sumatra *Semecarpus heterophyllus*, the use of the fruit of which is said to cause swelling and eruptions. The genus is restricted to Tropical Asia, except the common *Semecarpus anacardium*, which extends to North Australia.

MORINGEÆ.

Moringa pterygosperma, Gærtn.

Moringa pterygosperma, Gærtn.; Hook. f., Fl. Brit. Ind., ii. p. 45.

TIMOR LAUT.—A native of Tropical Asia, commonly cultivated there and in other tropical countries for the oil afforded by its winged seeds. There are only two other species, and the genus is confined to the Old World.

LEGUMINOSÆ.

PAPILIONACEÆ.

Crotalaria linifolia, Linn. f.

Crotalaria linifolia, Linn. f.; Benth., Fl. Austr., ii. p. 180; Miq., Fl. Ind. Bat., i. 1, p. 342; Hook. f., Fl. Brit. Ind., ii. p. 72.

TIMOR LAUT.—A very common species throughout Tropical Asia and Australia, growing equally well on the coast and inland. It is singular that this genus, which numbers between two and three hundred species, generally spread in tropical and subtropical regions, is almost entirely absent from the Pacific Islands. Seemann (Flora Vitiensis, p. 54) enumerates one, *Crotalaria quinquefolia*, Linn., which is also found in Tonga, and is widely spread in Tropical Asia, and also occurs in Tropical Australia. Horace Mann (Proc. Amer. Acad. Sci., xii. p. 163) includes three species in his Catalogue of Hawaiian Plants, two of which are treated as of recent introduction, while the third, *Crotalaria sericea*, Retz., he suspected to have been introduced by the aborigines. Jouan, in his sketch of the vegetation of some of the Pacific Islands (Mém. Soc. Sci. Nat. Cherbourg, 1865), does not mention a single species, nor does Nadeaud in his Énumération des Plantes Indigènes de l'Ile de Tahiti, 1873.

Crotalaria sericea, Retz.

Crotalaria sericea, Retz.; Miq., Fl. Ind. Bat., i. 1, p. 330; Hook. f., Fl. Brit. Ind., ii. p. 75.

TIMOR LAUT.—Common throughout Tropical India, including the Archipelago, where, as well as in other countries, it is often cultivated on account of its ornamental character. It occurs in the Sandwich Islands, where, however, as stated under *Crotalaria linifolia*, it is regarded as an introduced plant.

Indigofera anil, Linn.

Indigofera anil, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 307; Seem., Fl. Vit., p. 54; Oliver, Fl. Trop. Afr., ii. p. 98; Griseb., Fl. Brit. W. Ind., p. 181.

TIMOR LAUT.—This is one of the species most commonly cultivated for indigo dye,

and its native country is uncertain, or at least disputed. Bentham (DC., Prodr., ii. p. 225) treats it as an American plant, which has run wild from cultivation in the Old World. It is not mentioned in Hooker's Flora of British India; but Miquel is of opinion that it is indigenous there, as well as *Indigofera tinctoria*, a closely allied species. *Indigofera anil* is common, and apparently generally spread in a wild state in Tropical Africa. The genus numbers upwards of two hundred species, spread all over the tropics, and extending into some extratropical regions; the greatest concentration of species is in Tropical and South Africa.

Indigofera linifolia, Retz.

Indigofera linifolia, Retz.; Miq., Fl. Ind. Bat., i. 1, p. 315; Benth., Fl. Austr., ii. p. 195; Hook. f., Fl. Brit. Ind., ii. p. 92.

LARAT; TIMOR LAUT.—Common throughout Tropical Asia; occurring also in Northern Australia and in Eastern Tropical Africa.

Tephrosia purpurea, Pers.

Tephrosia purpurea, Pers.; Miq., Fl. Ind. Bat., i. 1, p. 296; Benth., Fl. Austr., ii. p. 209; Hook. f., Fl. Brit. Ind., ii. p. 112; Oliver, Fl. Trop. Afr., ii. p. 124.

Tephrosia piscatoria, Pers.; Seem., Fl. Vit., p. 55; A. Gray, Wilkes' U.S. Expl. Exped. Bot., i. p. 4[illegible] (*Tephrosia baueri*, Benth.)

TIMOR LAUT.—This shrub grows almost everywhere in the tropics, both in the Old World and America, extending in some countries into subtropical regions. It is a common seaside plant in the Archipelago, and in many of the Pacific Islands, including the Fiji, Society, and Sandwich Islands; but H. Mann (in Proc. Amer. Acad., vii. p. 163) places it in the category of plants most likely introduced into the Sandwich Islands by the aborigines. Nadeaud (Enum. Pl. Tahiti, p. 79) describes it as a plant of the first hills at 1000 to 1200 feet elevation, bearing the native name "Hora." *Tephrosia* numbers about one hundred species, spread over all the warmer regions of the earth.

Sesbania grandiflora, Pers.

Sesbania grandiflora, Pers.; Benth., Fl. Austr., ii. p. 212; Hook. f., Fl. Brit. Ind., ii. p. 115; H. Mann in Proc. Amer. Acad., vii. p. 163.

Agati grandiflora, Desv.; Miq., Fl. Ind. Bat., i. 1, p. 289.

TIMOR LAUT.—North Australia, and common throughout the Indian Archipelago, and often cultivated. It also occurs wild in India and the Mauritius, where it is doubtfully indigenous; and it is in the early collections from the Sandwich Islands; but Mann treats it as a plant introduced into the island by the aborigines. The genus, although counting less than a score of species, is spread all over the tropics.

Sesbania aculeata, Pers.

Sesbania aculeata, Pers.; Miq., Fl. Ind. Bat., i. 1, p. 287; Benth., Fl. Austr., ii. p. 212; Hook. f., Fl. Brit. Ind., ii. p. 114.

LETTI.—Everywhere in the tropics of the Old World; also occurring in the West Indies and Tropical America, where it is most likely a colonist.

Desmodium gangeticum, DC.

Desmodium gangeticum, DC.; Miq., Fl. Ind. Bat., i. 1, p. 247; Benth., Fl. Austr., ii. p. 232; Hook. f., Fl. Brit. Ind., ii. p. 168; Oliver, Fl. Trop. Afr., ii. p. 161.

ARROU; KI.—Widely diffused in the tropics of the Old World, and very common in many parts. Introduced in the West Indies. A large genus spread all over the tropics, and extending into the temperate zones in North America, Eastern Asia, South America, South Africa, and Australia. Several of the species are very widely dispersed.

Desmodium latifolium, DC.

Desmodium latifolium, DC.; Miq., Fl. Ind. Bat., i. 1, p. 246; Hook. f., Fl. Brit. Ind., ii. p. 168; Oliver, Fl. Trop. Afr., ii. p. 162 (sub. *Desmodio lasiocarpo*).

TIMOR LAUT.—Common in the Archipelago, in India, the Mascarene Islands, and Tropical Africa, though hitherto not collected in Australia. It exists as an introduced plant in the West Indies. There is a specimen of another species of this affinity in Timor Laut; perhaps *Desmodium megaphyllum*, Zoll.

Desmodium polycarpum, DC.

Desmodium polycarpum, DC.; Miq., Fl. Ind. Bat., i. 1, p. 242; Benth., Fl. Austr., ii. p. 235; Seem., Fl. Vit., p. 56; Hook. f., Fl. Brit. Ind., ii. p. 171; Oliver, Fl. Trop. Afr., ii. p. 165; Nadeaud, Enum. Pl. Tahiti, p. 79.

TIMOR LAUT.—North Australia to Japan, China, and the Himalayas; also in the Mascarene Islands and Eastern Tropical Africa, as well as many of the islands of the South Pacific, from the Fijis to the Marquesas.

Desmodium laxiflorum, DC.

Desmodium laxiflorum, DC.; Miq., Fl. Ind. Bat., i. 1, p. 251; Hook. f., Fl. Brit. Ind., ii. p. 164.

TIMOR LAUT.—Scattered in the Archipelago, eastward to the Philippines, and through Java to North-western India.

Desmodium ormocarpoides, DC.

Desmodium ormocarpoides, DC.; Miq., Fl. Ind. Bat., i. 1, p. 249; Hook. f., Fl. Brit. Ind., ii. p. 164.

BABAR.—Sumatra, Philippines, Ceylon, and the Western Peninsula of India. There is some doubt respecting the Babar plant being exactly this species.

Desmodium umbellatum, DC.

Desmodium umbellatum, DC. ; Miq., Fl. Ind. Bat., i. 1, p. 262 ; Benth., Fl. Austr., ii. p. 230 ; Hook. f., Fl. Brit. Ind., ii. p. 161 ; Seem., Fl. Vit., p. 56.
Dendrolobium umbellatum, Wight and Arnott ; Miq., Fl. Ind. Bat., i. 1, p. 262.

Arrou ; Ki ; Timor Laut.—North-eastern Australia ; many of the Pacific Islands ; throughout the Indian Archipelago and Malayan Peninsula ; Mascarene Islands ; Eastern Tropical Africa : often found on the sea-beach. It is naturalised in the West Indies.

Uraria crinita, DC. var.

Uraria crinita, DC. var. ; Miq., Fl. Ind. Bat., i. 1, p. 268 ; Hook. f., Fl. Brit. Ind., ii. p. 155.

Timor Laut.—Timor to China, and throughout India. *Uraria lagopoides*, DC., has nearly the same distribution, and is also found in North Australia and many of the islands of Eastern Polynesia.

Phylacium bracteosum, Bennett.

Phylacium bracteosum, Bennett in Horsf. Pl. Jav., p. 159, t. 23 ; Miq., Fl. Ind. Bat., i. 1, p. 228.

Ki ; Timor Laut.—A monotype, restricted, so far as at present known, to the Indian Archipelago. There are specimens in the Kew Herbarium from Java and Amboina.

Abrus precatorius, Linn.

Abrus precatorius, Linn. ; Miq., Fl. Ind. Bat., i. 1, p. 159 ; Benth., Fl. Austr., ii. p. 270 ; Seem., Fl. Vit., p. 63 ; Hook. f., Fl. Brit. Ind., ii. p. 175 ; Nadeaud, Enum. Pl. Tahiti, p. 81 ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 104.

Wetter.—Universally spread in the tropics, and extending into some subtropical regions, growing equally well on the sea-shore and inland. Seemann states that it is common in the woods all over the Fijis ; but although it occurs in many of the smaller Pacific Islands, it does not appear to be plentiful. Often cultivated, and probably only a colonist in America.

Clitoria ternatea, Linn.

Clitoria ternatea, Linn. ; Miq., Fl. Ind. Bat., i. 1, p. 226 ; Hook. f., Fl. Brit. Ind., ii. p. 208 ; Seem., Fl. Vit., p. 74 ; Oliver, Fl. Trop. Afr., ii. p. 177.

Ki ; Lettl.—Now very widely spread in tropical countries, especially where inhabited by civilised people ; but apparently absent from Australia, and certainly introduced into the Fiji Islands by foreign traders or missionaries, according to Seemann. It is one of the favourite garden flowers of hot countries, and is most likely of Indian origin. Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 103) states that it was introduced into the Marquesas by the French. Nadeaud does not include it in his list of Tahitian plants.

Mucuna pruriens, DC.

Mucuna pruriens, DC.; Hook. f., Fl. Brit. Ind., ii. p. 187; Oliver, Fl. Trop. Afr., ii. p. 187; Griseb., Fl. Brit. W. Ind., p. 198.
Mucuna prurita, Hook.; Miq., Fl. Ind. Bat., i. 1, p. 211.

Wetter; Dia.—Commonly cultivated and now almost cosmopolitan in the tropics, though doubtless in many parts only a colonist, as it is wanting in North Australia, and it is not included in Seemann's Flora Vitiensis. Further, there are no Polynesian specimens in the Kew Herbarium.

Mucuna bracteata, Roxb.?

Mucuna bracteata, Roxb.? Hook. f., Fl. Brit. Ind., ii. p. 186.

Timor Laut.—This species has a wide range in India, but we have seen no Archipelago specimens that could be referred to it without doubt.

Mucuna (Stizolobium) sp.

Timor Laut.—Insufficient for satisfactory determination. A species of *Mucuna* likely to occur in the South-eastern Moluccas, but of which we have seen no insular specimens eastward of Timor, is *Mucuna gigantea*, DC. This species has a very wide range in Tropical Asia, Australia, and Polynesia, from the Fijis to the Sandwich Islands. It is one of the gigantic climbers that interlace the forests of *Paritium*, *Barringtonia*, *Calophyllum*, *Thespesia*, &c., that succeed the Mangroves which grow below high-water mark. Both Seemann and Nadeaud specially mention this species.

Galactia tenuiflora, Wight and Arnott var.?

Galactia tenuiflora, Wight and Arnott var.? Miq., Fl. Ind. Bat., i. 1, p. 220; Benth., Fl. Austr., ii. p. 255; Hook. f., Fl. Brit. Ind., ii. p. 192.

Timor Laut.—North Australia to the Himalayas; Tropical and South Africa; Tropical America; but not in Polynesia.

Canavalia ensiformis, DC.

Canavalia ensiformis, DC.; Hook. f., Fl. Brit. Ind., ii. p. 195; Oliver, Fl. Trop. Afr., ii. p. 190.
Canavalia gladiata, DC.; Miq., Fl. Ind. Bat., i. 1, p. 216; Griseb., Fl. Brit. W. Ind., p. 197.

Arrou; Timor Laut.—Common nearly all over Tropical Asia, Africa, and America, especially in maritime districts; but apparently wanting in Australia and the Pacific Islands. It is extensively cultivated.

Canavalia obtusifolia, DC.

Canavalia obtusifolia, DC.; Miq., Fl. Ind. Bat., i. 1, p. 215; Benth., Fl. Austr., ii. p. 256; Seem., Fl. Vit., p. 58; Nadeaud, Enum. Pl. Tahiti, p. 79; Hook. f., Fl. Brit. Ind., ii. p. 196.

Timor Laut.—Common on sandy coasts in all tropical countries, including most of the Pacific Islands from which we have botanical collections.

Vigna lutea, A. Gray.

Vigna lutea, A. Gray, Wilkes' U.S. Expl. Exped. Bot., i. p. 452; Benth., Fl. Austr., ii. p. 259; Seem., Fl. Vit., p. 62; Oliver, Fl. Trop. Afr., ii. p. 206; H. Mann in Proc. Amer. Acad., vii. p. 164; Nadeaud, Enum. Pl. Tahiti, p. 80.

TIMOR LAUT.—A common sea-coast plant in warm countries of both hemispheres, including many of the Pacific Islands, from the Fijis to the Sandwich Islands. It is often associated with *Canavalia obtusifolia* and *Ipomœa pes-caprœ*.

Vigna luteola, Benth.

Vigna luteola, Benth. Fl. Austr., ii. p. 260; Hook. f., Fl. Brit. Ind., ii. p. 205; Oliver, Fl. Trop. Afr., ii. p. 205.

TIMOR LAUT.—This likewise is a very widely spread plant, though not so common as *Vigna lutea*. Besides these two very common species there are several others spread over the warm regions of both hemispheres, including two endemic in the Sandwich Islands.

Psophocarpus tetragonolobus, DC.

Psophocarpus tetragonolobus, DC.; Hook. f., Fl. Brit. Ind., ii. p. 211; Miq., Fl. Ind. Bat., i. 1, p. 181.

TIMOR LAUT.—A commonly cultivated herb, and occurring in a wild state from Timor to the Philippines and India. The genus comprises four species, natives of Tropical Asia and Africa. *Psophocarpus longepedunculatus* is even more widely diffused as a colonist escaped from cultivation.

Dolichos lablab, Linn.

Dolichos lablab, Linn.; Hook. f., Fl. Brit. Ind., ii. p. 209; Oliver, Fl. Trop. Afr., ii. p. 210; H. Mann in Proc. Amer. Acad., vii. p. 164.
Lablab vulgaris, Savi; Seem., Fl. Vit., p. 62; Miq., Fl. Ind. Bat., i. 1, p. 189.

TIMOR LAUT.—Cultivated generally in the tropics, and also existing in a wild state. Like many other plants which seem to owe their wide distribution to cultivation, rather than other means, this is not found in Australia.

Cajanus indicus, Linn.

Cajanus indicus, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 174; Hook. f., Fl. Brit. Ind., ii. p. 217; Oliver, Fl. Trop. Afr., ii. p. 216; Griseb., Fl. Brit. W. Ind., p. 191; Seem., Fl. Vit., p. 74; H. Mann in Proc. Amer. Acad., vii. p. 164.

BABAR; TIMOR LAUT.—A monotype, cultivated and wild almost throughout the tropics; but where it is really indigenous is uncertain. It is not found in Australia, and when Seemann visited the Fijis it only existed there as a garden plant.

Flemingia strobilifera, R. Br.

Flemingia strobilifera, R. Br.; Miq., Fl. Ind. Bat., i. 1, p. 161; Hook. f., Fl. Brit. Ind., ii. p. 227.

Babar; Letti; Timor Laut.—Northward to the Philippines, and throughout India to Simla and Kumaon in the north-west. Naturalised in the Mauritius and West Indies. The genus comprises about twenty-five species restricted to the Old World; several of them inhabit Australia and Africa.

Derris uliginosa, Benth.

Derris uliginosa, Benth., Fl. Austr., ii. p. 272; Miq., Fl. Ind. Bat., i. 1, p. 141; Hook. f., Fl. Brit. Ind., ii. p. 241; Oliver, Fl. Trop. Afr., ii. p. 245; Seem., Fl. Vit., p. 65.

Arrou.—A common seaside climbing shrub, ranging from Polynesia, Northern Australia, and South-eastern Africa to China, Madagascar, and India. Seemann says:—"Grows plentifully on the sea beach, and by its long running root-stock helps to keep the same together. The flowers appear from every part of the plant, occasionally even from the roots." It has been collected in the Tongan Islands, Erromanga, New Hebrides, and New Caledonia. *Derris* is represented in America by three species, the rest being Asiatic; the present being the only one hitherto collected in Africa.

Pongamia glabra, Vent.

Pongamia glabra, Vent.; Miq., Fl. Ind. Bat., i. 1, p. 147; Benth., Fl. Austr., ii. p. 273; Hook. f., Fl. Brit. Ind., ii. p. 240; Seem., Fl. Vit., p. 65.

Timor Laut.—Northern Australia and Polynesia, through the Archipelago to the Himalayas; also in the Seychelles. In the Archipelago and Polynesia it seems to be essentially a coast plant; and Seemann says it always grows near the sea-beach in the Fijis, for which reason it has been called "vesi ni wai," *i.e.*, water vesi. The genus is monotypic.

Inocarpus edulis, Linn.

Inocarpus edulis, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 888; Nadeaud, Enum. Pl. Tahiti, p. 81; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 113; Seem., Fl. Vit., p. 70.

Timor Laut.—A large tree generally spread over the Archipelago and Polynesia, from the Fijis to the Marquesas. It furnishes an edible fruit, and it possesses, according to Seemann, extraordinary power of reproduction from seed. It is common in New Guinea, but does not reach either Australia or the Sandwich Islands. Even in the Marquesas, at the extreme eastern limit of its area, it forms dense woods of considerable extent, but the individual trees do not attain the gigantic size they do in New Guinea and the Fiji Islands.

Sophora tomentosa, Linn.

Sophora tomentosa, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 124; Seem., Fl. Vit., p. 66; Benth., Fl. Austr., ii. p. 274; Hook. f., Fl. Brit. Ind., ii. p. 249; Nadeaud, Enum. Pl. Tahiti, p. 81; Griseb., Fl. Brit. W. Ind., p. 203.

ARROU; TIMOR LAUT.—A generally diffused tree on tropical sea-coasts, extending into some subtropical regions. It is common on the sea-beach of many of the Pacific Islands, though not reaching the Marquesas or Sandwich Islands, where it is replaced by other species. Nadeaud notes that it is common, especially on coral islands; and Seemann states that it is common on the sea-beach throughout the Fijis. In the Atlantic it extends to the Bermudas. The genus comprises between twenty and thirty species, spread over the warmer regions of both hemispheres. Several of the species have a wide geographical area, including *Sophora tetraptera*, which is widely spread in the south temperate zone; particulars of its distribution will be found on page 32 of this Part.

CÆSALPINIEÆ.

Peltophorum ferrugineum, Benth.

Peltophorum ferrugineum, Benth., Fl. Austr., ii. p. 279; Hook. f., Fl. Brit. Ind., ii. p. 257.
Cæsalpinia ferruginea, Dene.; Miq., Fl. Ind. Bat., i. 1, p. 111.

DAMMAR; TIMOR LAUT.—North Australia to the Philippines and Singapore, Malacca, and the Andamans. The genus consists of about five species, two of which are American, and one African.

Cæsalpinia nuga, Ait.

Cæsalpinia nuga, Ait.; Miq., Fl. Ind. Bat., i. 1, p. 108; Benth., Fl. Austr., ii. p. 277; Hook. f., Fl. Brit. Ind., ii. p. 255; Seem., Fl. Vit., p. 66.

TIMOR LAUT.—Northern Australia and New Hebrides to the Philippines, Southern China, and nearly the whole of Tropical India. The genus is a considerable one, and generally spread over the tropics.

Cæsalpinia pulcherrima, Swartz.

Cæsalpinia pulcherrima, Swartz; Miq., Fl. Ind. Bat., i. 1, p. 111; Hook. f., Fl. Brit. Ind., ii. p. 255; Oliver, Fl. Trop. Afr., ii. p. 262; Griseb., Fl. Brit. W. Ind., p. 205.

TIMOR LAUT.—This handsome tree is cultivated and more or less wild in nearly all tropical countries, except Australia, and it is uncertain where it is really indigenous, though probably in some part of the Old World.

Cæsalpinia bonducella, Fleming.

Cæsalpinia bonducella, Fleming; Hook. f., Fl. Brit. Ind., ii. p. 254; Oliver, Fl. Trop. Afr., ii. p. 262; Seem., Fl. Vit., p. 66.
Guilandina bonducella, Linn.; Benth., Fl. Austr., ii. p. 276; Griseb., Fl. Brit. W. Ind., p. 204; Nadeaud, Enum. Pl. Tahiti, p. 81.
Guilandina bonduc, Miq., Fl. Ind. Bat., i. 1, p. 113, *partim*.

Timor Laut.—Almost cosmopolitan in the tropics, and, although essentially a seaside plant in the Indian Archipelago and Polynesia, it reaches the Himalayas in India, as far to the north-west as Kumaon. Nadeaud states that it was the only spiny plant in Tahiti before the arrival there of Europeans. The hard seeds are conveyed [in their light prickly pods ?] long distances by oceanic currents, without losing the power of germinating. Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 105) enumerates, probably by mistake, the allied *Cæsalpinia bonduc*, Roxb. (*Guilandina bonduc*, Linn.), and says that it is as common in the Marquesas as brambles are in Europe. H. Mann (in Proc. Amer. Acad., vii. p. 164) also records the latter from the Sandwich Islands, but the only specimens in the Kew Herbarium from the Sandwich, Friendly, and Society Islands are certainly *Cæsalpinia bonducella*, from which *Cæsalpinia bonduc* differs in having yellow seeds, larger less hairy leaflets, and especially in having no conspicuous stipules. *Cæsalpinia bonduc* is a much rarer plant than *Cæsalpinia bonducella;* the only Polynesian specimen in the Kew Herbarium being from the Fijis and Norfolk Island.

Cassia fistula, Linn.

Cassia fistula, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 89; Hook. f., Fl. Brit. Ind., ii. p. 261; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 514.

Ki; Moa.—Mr Bentham regards this species, which is highly ornamental and commonly planted in tropical countries, as truly indigenous in the Archipelago and India, and possibly, though not probably so, in Africa, and as introduced in America. It is another instance of a widely dispersed tropical plant that does not reach Australia. *Cassia* comprises between three and four hundred species, varying in habit and duration from annual herbs to gigantic trees, and generally spread over the tropical and subtropical regions of both hemispheres, but most numerous in America. A few herbaceous species inhabit North America, reaching New England and Illinois.

Cassia alata, Linn.

Cassia alata, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 93; Hook. f., Fl. Brit. Ind., ii. p. 264; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 550.

Timor Laut.—This species is now spread over Tropical Asia, Africa, and America, but it is only in the last country that it is universal, and it is perhaps not indigenous in the Old World. It has not been collected in Australia.

Cassia javanica, Linn.

Cassia javanica, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 90; Hook. f., Fl. Brit. Ind., ii. p. 267; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 517.

Ki; Timor Laut.—Amboina to Java, and perhaps the Malayan Peninsula.

Cassia sophera, Linn.

Cassia sophera, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 92; Benth., Fl. Austr., ii. p. 283; Hook. f., Fl. Brit. Ind., ii. p. 262; Seem., Fl. Vit., p. 67; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 532.

LETTI.—Concerning this species Mr Bentham says: "Tropical Asia, Africa, and Australia, more rare in Tropical America, chiefly in Central America, the West Indian Islands, and Columbia; in all continents most frequently only from cultivation, or escaped from cultivation, with some evidence of being really indigenous in Australia, and more doubtfully so in Asia and America."

Seemann records it only from waste places in the Fijis. Forster collected it in the Tongan Islands, and Sir E. Horne in Uvea or Wallis Island.

Cassia tora, Linn.

Cassia tora, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 95; Hook. f., Fl. Brit. Ind., ii. p. 263; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 535.

TIMOR LAUT.—Generally spread in Tropical Asia, Africa, and America, and certainly truly indigenous in the first named country, if not in the others. It is common in cultivated and waste ground, especially in America, where it extends northward to South Carolina. Mr Bentham records it from Australia, but we find no specimens, and it is not included in his Flora, so we think it is an error.

Cassia megalantha, Dcne. ?

Cassia megalantha, Dcne.? Miq., Fl. Ind. Bat., i. 1, p. 90; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 517.

TIMOR LAUT.—Only recorded from Timor previously. It is allied to *Cassia javanica*.

Cassia mimosoides, Linn.

Cassia mimosoides, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 101; Benth., Fl. Austr., ii. p. 291; Hook. f., Fl. Brit. Ind., ii. p. 266; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 579.

TIMOR, LAUT.—Tropical Asia, Africa, Australia, and America, though rarer in the last named country.

Bauhinia blancoi, Baker.

Bauhinia blancoi, Baker in Hook. f., Fl. Brit. Ind., ii. p. 278.
Phanera blancoi, Benth., Pl. Jungh., p. 264.

TIMOR LAUT.—Previously known only from the Philippine Islands and Siam. *Bauhinia* is a large genus spread all over the tropics.

Saraca sp. ?

ARROU.—An imperfect specimen of what may be a species of this genus, which is a small one restricted to Tropical Asia.

Cynometra ramiflora, Linn.

Cynometra ramiflora, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 78; Benth., Fl. Austr., ii. p. 296; Hook. f., Fl. Brit. Ind., ii. p. 267.

Timor Laut.—North Australia to the Philippines, the Malayan and Western Peninsulas of India, and in Ceylon. The genus numbers about twenty species, distributed over the tropical regions of both hemispheres; two species inhabit the Fiji and Tongan Islands.

Mimoseæ.

Entada scandens, Benth.

Entada scandens, Benth., Fl. Austr., ii. p. 298; Seem., Fl. Vit., p. 71; Hook. f., Fl. Brit. Ind., ii. p. 287; Oliver, Fl. Trop. Afr., ii. p. 325.
Entada pursætha, DC.; Miq., Fl. Ind. Bat., i. 1, p. 45.
Faba marina seu parang, Rumph., Herb. Amboin., v. p. 5, t. 4.

Although we have not actually seen specimens of this from any of the islands within our limits, we have evidence of its existence, and being a very remarkable plant it deserves special mention. It is a gigantic climber, bearing the largest seed-vessel of any member of the order to which it belongs, it often attaining a length of three to four, and sometimes six to eight feet, with a breadth of four or five inches; and the seeds are sometimes as much as two inches in diameter.

This plant has a very wide range in the tropics of both hemispheres, that is, if the eastern and western specimens be correctly referred to one species, which is not beyond doubt. It is found in North Australia, and northward to the Marianne Islands, and the north of India, growing apparently equally as well on the sea-shore as on the Himalaya Mountains. Seemann (Kittlitz, Views of the Vegetation of the Pacific, p. 22) states that this is the only real climbing plant in the Mangrove swamps of the Pacific Islands, where, in the Fijis, for instance, he had seen festoons of it several hundred yards long. As already mentioned in this Report, Part II., p. 80, the seeds are conveyed enormous distances by oceanic currents without losing their vitality. This fact would account for its present wide distribution. Many other members of this order especially, included in this list, doubtless owe their wide dispersion to the same cause.

Dichrostachys nutans, Benth.

Dichrostachys nutans, Benth. in Trans. Linn. Soc. Lond., xxx. p. 382; Oliver, Fl. Trop. Afr., ii. p. 333.
Dichrostachys cinerea, Miq., Fl. Ind. Bat., i. 1, p. 48, *quoad plantam Javanicam, fide* Benth., Fl. Austr., ii. p. 299.

Moa; Wetter.—North Australia and some of the islands of the Indian Archipelago, and common throughout Tropical Africa. This species is very closely allied to *Dichrostachys cinerea*, Wight and Arnott, a very common one in Tropical Asia. The genus is exclusively Old World.

Acacia farnesiana, Willd. ?

Acacia farnesiana, Willd. ? Miq., Fl. Ind. Bat., i. 1, p. 7; Benth., Fl. Austr., ii. p. 419; Hook. f., Fl. Brit. Ind., ii. p. 292; Benth. in Trans. Linn. Soc. Lond., xxx. p. 502.

LETTI.—This species is a favourite cultivated plant in the tropics on account of the delightful fragrance of its flowers; and it also exists in a wild state in nearly all warm countries. Respecting its distribution, Mr Bentham, *loc. cit.*, says: "Widely spread over the tropical and subtropical regions of the New and the Old World, but so generally cultivated for the perfume of its flowers, and so frequently established as an escape from cultivation, that it is difficult to determine where it is really indigenous. It appears, however, to be so in Western America, from Northern Chili to Texas, not, perhaps, in Brazil nor in Guiana; abundant in tropical and subtropical Northern-Central Australia, and in the interior of North-Eastern Australia, and perhaps also really indigenous in Tropical South Africa, but introduced only into the East Indies, Northern Tropical Africa, and the Mediterranean region." Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 107) and H. Mann (in Proc. Amer. Acad., vii. p. 165), both treat it as certainly introduced in Eastern Polynesia.

Acacia numbers nearly 450 species, generally spread over the warmer parts of the world, but most numerous in Australia and Africa; in the former there are nearly 300, and, with the single exception of *Acacia farnesiana*, they are endemic.

ROSACEÆ.

Parinarium sp.

WETTER.—*Parinarium* is a genus of about forty arboreous species, generally spread in tropical countries; the seed-vessel has a hard woody endocarp.

Rubus glomeratus, Blume.

Rubus glomeratus, Blume; Miq., Fl. Ind. Bat., i. 1, p. 381; Hook. f., Fl. Brit. Ind., ii. p. 328.

DAMMAR.—Also found in Java, Borneo, the Philippines, and in Penang. This is allied to the very variable *Rubus moluccanus*, which is exceedingly common and generally spread in Tropical Asia. Genus very widely dispersed, though very few species are found in south temperate regions.

CRASSULACEÆ.

Bryophyllum calycinum, Salisb.

Bryophyllum calycinum, Salisb.; Hook. f., Fl. Brit. Ind., ii. p. 413; Oliver, Fl. Trop. Afr., ii. p. 390.

KI; TIMOR LAUT.—This plant is now very widely dispersed in tropical and subtropical countries, except Australia, but it is probable that it is only indigenous in Africa. It has been carried from place to place as a curiosity, from the fact that a very small

portion of a leaf will, under favourable conditions, grow into an independent plant. Possessing this viviparous property the plant multiplies itself at a prodigious rate, and as stated in Part I., p. 31, it is one of the commoner plants in the Bermudas.

RHIZOPHOREÆ.

Rhizophora mucronata, Lam.

Rhizophora mucronata, Lam.; Miq., Fl. Ind. Bat., i. 1, p. 583; Benth., Fl. Austr., ii. p. 493; Hook. f., Fl. Brit. Ind., ii. p. 435; Seem., Fl. Vit., p. 91.

Arrou; Timor Laut.—This is one of the commonest of the Mangroves in the tidal swamps of Tropical Asia, insular and continental; it is also in Eastern Africa, Northern Australia, the Fiji, Samoan, and other islands of Polynesia. Jouan (in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 149) enumerates "*Rhizophora mangle*, Linn." as a native of New Caledonia, the Archipelago, &c.; but Miquel is probably right (Fl. Ind. Bat., i. 1, p. 584) where he says, "*Rhizophora mangle*, Linn., et al. ex parte quoad stirpem gerontog." The true *Rhizophora mangle*, Linn., appears to be restricted to America and Western Africa; see Part I., p. 32.

Bruguiera rheedii, Blume?

Bruguiera rheedii, Blume? Miq., Fl. Ind. Bat., i. 1, p. 587; Benth., Fl. Austr., ii. p. 494; Seem., Fl. Vit., p. 91.

Dammar.—A common Mangrove, ranging from Northern Australia to Sumatra, and in Western Polynesia. In the Flora of British India (ii. p. 437), this species is reduced to *Bruguiera gymnorhiza*, Lam., which gives it a much wider range in Tropical Asia, the Mascarene Islands, and Eastern Africa. In Oliver's Flora of Tropical Africa (ii. p. 409), the African species of this genus is named *Bruguiera cylindrica*, Blume, with a note to the effect that it is probably not distinct from *Bruguiera gymnorhiza*, Blume, and *Bruguiera capensis*, Blume. It is described as the commonest and handsomest of the Zambesi Mangroves, extending farther inland than the others, though equally littoral. In appearance, these so-called species are so much alike that they may well be one.

Bruguiera caryophylloides, Blume?

Bruguiera caryophylloides, Blume? Miq., Fl. Ind. Bat., i. 1, p. 589; Hook. f., Fl. Brit. Ind., ii. p. 438.

Arrou.—Tidal forests of the Archipelago and India, from Malabar to Malacca and Ceylon. The specimens of this and the preceding from the Moluccas are too imperfect for the species to be determined with absolute certainty. *Bruguiera* is not represented in America.

Anisophyllea sp.?

Dia.—A somewhat anomalous genus of this order, comprising about half-a-dozen species, restricted to Tropical Asia.

COMBRETACEÆ.

Terminalia sp.

KI.—A large genus of trees, generally spread in the tropics, and common in the Indian Archipelago and Australia. *Terminalia catappa*, the Indian Almond, is now found nearly all over the area of the genus.

Lumnitzera coccinea, Wight and Arnott.

Lumnitzera coccinea, Wight and Arnott; Miq., Fl. Ind. Bat., i. 1, p. 606; Benth., Fl. Austr., ii. p. 503; Hook., f., Fl. Brit. Ind., ii. p. 452; Seem., Fl. Vit., p. 94.

TIMOR LAUT.—A common tree in the Mangrove swamps of the Archipelago and the Malayan Peninsula, extending to the Fijis and Northern Australia. Another species, *Lumnitzera racemosa*, has the same range as the present, and is also found in the Western Peninsula of India, in Ceylon, and in Eastern Africa.

Quisqualis sp.

WETTER.—*Quisqualis* is a genus of four or five species, one of which is African? and the rest Asiatic; and *Quisqualis indica*, the commonest of them, is cultivated generally in the tropics, and is wild throughout the Archipelago and India. The present plant may be that species.

Gyrocarpus jacquini, Roxb.

Gyrocarpus jacquini, Roxb.; Hook. f., Fl. Brit. Ind., ii. p. 461; Benth., Fl. Austr., ii. p. 505; Seem., Fl. Vit., p. 95; Oliver, Fl. Trop. Afr., ii. p. 435.
Gyrocarpus asiaticus, Willd.; Miq., Fl. Ind. Bat., i. 1, p. 978.
Gyrocarpus americanus, Jacq.; DC., Prodr., xv. 1, p. 247.

TIMOR LAUT.—This tree grows in maritime districts throughout the tropics, but it is comparatively rare in America, and especially in Africa, being only recorded from Angola. In America it ranges from Mexico to Venezuela and New Grenada. The seed-vessel is crowned by two long wings, giving it the appearance of a small shuttlecock.

MYRTACEÆ.

Melaleuca leucadendron, Linn.

Melaleuca leucadendron, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 401; Benth., Fl. Austr., iii. p. 142; Hook. f., Fl. Brit. Ind., ii. p. 465.

TIMOR LAUT.—Common in Tropical Australia, and throughout the Indian Archipelago to Cochin-China, Malacca, and Mergui in the Malayan Peninsula. A very variable species,

both in Australia itself and in the Archipelago, and several forms have been described as species. It is one of the few essentially Australian types that extend beyond Australia (New Caledonia being regarded as belonging to the same floral region). In Australia proper there are between ninety and a hundred species of *Melaleuca*, presenting a great diversity in foliage and inflorescence; but *Melaleuca leucadendron* is the only one, we believe, found north of Australia. As limited in the Flora of British India, it includes *Melaleuca minor*, Smith, *Melaleuca saligna*, Blume, *Melaleuca viridiflora*, Gært., *Melaleuca cumingiana* and *Melaleuca lanceolata*, Turcz., and *Melaleuca cajuputi*, Roxb.

The other specially Australian myrtaceous types, extending into the Archipelago and Continental Asia, are:—*Bœckea frutescens*, Linn.—Malacca and South China, to Borneo and Sumatra; *Leptospermum amboinense*, Blume—Malacca to Australia and Tasmania; *Leptospermum javanicum*, Blume—Moulmein, Java, and Sumatra. *Bœckea* numbers about fifty Australian species, and *Leptospermum* twenty-five, whereof two inhabit New Zealand, and the rest Australia.

Rhodomyrtus macrocarpa, Benth. var.?

Rhodomyrtus macrocarpa, Benth. var.? Fl. Austr., iii. p. 273.

ARROU.—Only recorded from Queensland. *Rhodomyrtus* is a genus of five species, four of which are Australian, and one, *Rhodomyrtus tomentosa*, DC., which is spread nearly all over Tropical Asia.

Nelitris paniculata, Lindl.

Nelitris paniculata, Lindl.; Benth., Fl. Austr., iii. p. 279.
Nelitris pallescens, Miq., Fl. Ind. Bat. Suppl., i. p. 314.
Decaspermum paniculatum, Kurz in Journ. As. Soc. Beng., xlvi. (1877), 2, p. 61; Hook. f., Fl. Brit. Ind., ii. p. 470.

KI.—North Australia to the Philippines and Bengal. With this exception, the genus is not known to be represented in Australia; the rest of the species being at home in the Indian Archipelago and Pacific Islands.

Eugenia javanica, Lam.?

Eugenia javanica, Lam.? Hook. f., Fl. Brit. Ind., ii. p. 474.
Jambosa alba, Rumph., Herb. Amb., i. p. 127, t. 39; Miq., Fl. Ind. Bat., i. 1, p. 413, *partim*.

KI; TIMOR LAUT.—Archipelago, and Malayan Peninsula. There is an imperfect specimen, from Ki Island, of another species of this vast and widely spread genus; a second from Arrou, and a third from Timor Laut.

Eugenia malaccensis, Linn.

Eugenia malaccensis, Linn.; Hook. f., Fl. Brit. Ind., ii. p. 471.
Jambosa domestica, Rumph., Herb. Amb., i. p. 121, t. 37, *excl. quib. carr. fide Miq.*, Fl. Ind. Bat., i. 1, p. 411.
Jambosa malaccensis, DC., Prodr., iii. p. 286; Bot. Mag., t. 4408.

ARROU.—The specimen is hardly sufficient to enable us to be certain of its being this species, which, however, is very variable; it is generally cultivated in the Archipelago, as well as in other tropical countries. It is also an indigenous wild plant in the Archipelago.

Barringtonia speciosa, Linn. f.

Barringtonia speciosa, Linn. f., Suppl., p. 312; Forst., Char. Gen., t. 38; Benth., Fl. Austr., iii. p. 288; Hook. f., Fl. Brit. Ind., ii. p. 507; Miq., Fl. Ind. Bat., i. 1, p. 485; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 108, 135, 139, et 149; Seem., Fl. Vit., p. 82.

ARROU.—A maritime tree attaining gigantic proportions in some parts of the Archipelago. It is now generally spread in the region, and it extends to the shores of the Malayan Peninsula, and some other parts of India, though Beddome (Forester's Manual of Botany for Southern India, p. 112) believes it is not wild in the Western Peninsula, though common enough on the coast of Ceylon. It is also common in Madagascar, the Seychelles, Mauritius, and westward to the Comoro Islands, but hitherto it has not been found on the coast of Continental Africa. Southward it reaches North Australia, and it is found throughout Polynesia, being one of the first plants, according to Jouan, to invade the coral islands; the very large, square, light, fibrous fruit being one of those most commonly and abundantly conveyed from place to place by oceanic currents. It is not recorded from the Sandwich Islands; but Mr J. S. Arundel lately collected it in the remote Ducie Island; and it has also been sent to the Kew Herbarium from Diego Garcia, Chagos Islands. *Barringtonia* does not reach the American continent.

Barringtonia racemosa, Bume.

Barringtonia racemosa, Blume; Miq., Fl. Ind. Bat., i. 1, p. 486; Seem., Fl. Vit., p. 83; Hook. f., Fl. Brit. Ind., ii. p. 507; Oliver, Fl. Trop. Afr., ii. p. 438.

ARROU; WETTER.—This is also a seaside tree, as indeed are all the species of the genus, and is nearly as widely dispersed as *Barringtonia speciosa;* but it is not reported from Australia, and it is less generally diffused in Polynesia. On the other hand, it is commoner on the Indian coast, and it is abundant, in some parts at least, on the eastern coast of Tropical Africa. The fruit of *Barringtonia racemosa* is much smaller than that of *Barringtonia speciosa*. There is an imperfect specimen of a third species of this genus from Timor Laut.

LYTHRACEÆ.

Pemphis acidula, Forst.

Pemphis acidula, Forst.; Miq., Fl. Ind. Bat., i. 1, p. 619; Benth., Fl. Austr., iii. p. 300; Hook. f., Fl. Brit. Ind., ii. p. 573; Oliver, Fl. Trop. Afr., ii. p. 482; Nadeaud, Enum. Pl. Tahiti, p. 78.

Arrou; Ki; Maru; Timor Laut.—An exceedingly common seaside shrub in many parts of the tropics of the Old World, including the eastern coast of Africa. It is also in many of the coral islands of Polynesia, though not exclusively on coral islands, as the Rev. T. Powell states on a label in the Kew Herbarium, for Barclay collected it in Tahiti, and Wright collected it in Loochoo, and Chamisso collected it in Romanzoff Island. Seemann does not include it in his Flora Vitiensis, nor are there specimens thence in the Kew Herbarium. Dr Coppinger, of H.M.S. "Nassau," collected it in Du Lise Island, Gloriosa Group, and Poivre Island, Amirante group, in 1882. Seed-vessel small and dry, containing numerous small, light, angular seeds. Darwin, as quoted by Henslow (Annals of Natural History, i. p. 340), says of this shrub: "No sooner has a new reef become sufficiently elevated by the accumulation of sand upon its surface, but this plant is sure to be the first to take possession of the soil." *Ipomœa biloba* (*Ipomœa pes-capræ*) is another plant that forms part of the earliest phanerogamic vegetation in such situations.

SAMYDACEÆ.

Casearia sp.

Moa; Lakor.—The genus *Casearia* is a large one, generally spread in the tropics, but most numerous in America.

CUCURBITACEÆ.

Luffa ægyptiaca, Miller.

Luffa ægyptiaca, Miller; Miq., Fl. Ind. Bat., i. p. 666; Benth., Fl. Austr., iii. p. 316; Hook. f., Fl. Brit. Ind., ii. p. 614; Oliver, Fl. Trop. Afr., ii. p. 530.
Luffa cylindrica, Rœm., Synops., ii. p. 63.
Luffa insularum, A. Gray, U.S. Expl. Exped., Bot. i. p. 644.

Ki; Larat; Wetter; Timor Laut.—Commonly cultivated throughout the tropics for the fruit, which is eaten in a young state. The ripe fruit is ultimately fibrous and very light, and the plant is consequently very widely dispersed in a wild state. There are several allied species not easily distinguishable in the absence of ripe fruit. *Luffa insularum* is a common maritime form in the Fiji, Tahiti, Tongan Islands, &c. Cogniaux (in DC. Monogr. Phanerog., iii. p. 456) retains Rœmer's name, *Luffa cylindrica*, for this species, reducing to it a number of species of various botanists.

Citrullus vulgaris, Schrad.

Citrullus vulgaris, Schrad. ; Hook. f., Fl. Brit. Ind., ii. p. 621 ; Seem., Fl. Vit., p. 104 ; Oliver, Fl. Trop. Afr., ii. p. 549.
Citrullus edulis, Spach. ; Miq., Fl. Ind. Bat., i. 1, p. 662.
Cucurbita citrullus, Linn. ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 149.

Moa.—The Water-melon exists in a wild and cultivated state in nearly all tropical and many subtropical countries, but it is believed to be really indigenous only in Tropical Africa. It is cultivated, and more or less wild, in many of the islands of Polynesia, where, however, according to Seemann, it is known to have been introduced by Europeans.

Momordica charantia, Linn.

Momordica charantia, Linn. ; Miq., Fl. Ind. Bat., i. 1, p. 663 ; Hook. f., Fl. Brit. Ind., ii. p. 616 ; Oliver, Fl. Trop. Afr., ii. p. 537 ; Seem., Fl. Vit., p. 105.

Timor Laut.—Commonly cultivated and naturalised in tropical countries, and probably indigenous in Tropical Africa. Seemann collected it in the Fijis, and he mentions that it was collected in Tahiti by Banks and Solander. *Momordica balsamina*, Linn., has nearly the same range as the present, and also extends to Australia. Both species are regarded by Cogniaux (DC., Monogr. Phanerog., iii. pp. 437 et 440) as introduced in America.

Lagenaria vulgaris, Seringe.

Lagenaria vulgaris, Seringe ; Benth., Fl. Austr., iii. p. 316 ; Miq., Fl. Ind. Bat., i. 1, p. 669 ; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 149 ; Seem., Fl. Vit., p. 106 ; Nadeaud, Enum. Pl. Tahiti, p. 66.

The Calabash Gourd, generally cultivated for the fruit, which is not eaten, but used for making bottles, &c. It was found in Easter Island, the Sandwich Islands, and other parts of Polynesia, when first discovered by Europeans.

Cucumis trigonus, Roxb. ?

Cucumis trigonus, Roxb. ? Hook. f., Fl. Brit. Ind., ii. p. 619 ; Benth., Fl. Austr., iii. p. 317 ; Miq., Fl. Ind. Bat., i. 1, p. 671 (*Cucumis turbinatus*).

Timor Laut.—Generally diffused in Tropical Asia and extending to North Australia.

Zehneria sp. (aff. *Zehneriæ mucronatæ*, Miq.)

Timor Laut.—The species may be different from the Java plant. *Zehneria*, as circumscribed by Bentham and Hooker, is confined to the Old World, with the exception of one species in Peru.

Bryonia sp. (aff. *Bryoniæ laciniosæ*, Linn.)

Timor Laut.—Probably only a variety of *Bryonia laciniosa*, which is generally spread in the tropics of the Old World.

FICOIDEÆ.

Sesuvium portulacastrum, Linn.

Sesuvium portulacastrum, Linn.; Benth., Fl. Austr., iii. p. 328; Hook. f., Fl. Brit. Ind., ii. p. 659; Miq., Fl. Ind. Bat., i. 1, p. 1060 (*Sesuvium repens*, Willd.); Nadeaud, Enum. Pl. Tahiti, p. 67; Guillemin in Ann. Sci. Nat., sér. 2, vii. p. 350.

Maru.—This perennial herb is common, especially on sandy sea-shores throughout tropical and subtropical regions, including many remote islands; as the Bermudas, Ascension, St Helena, Easter Island, the Sandwich Islands, the Phœnix group, &c. It often grows where it is covered at high water. In the Galapagos is a species, *Sesuvium edmonstonei*, which is endemic.

UMBELLIFERÆ.

Carum roxburghianum, Benth.

Carum roxburghianum, Benth.; Hook. f., Fl. Brit. Ind., ii. p. 682.
Apium involucratum, Roxb., Hort. Beng., p. 22, et Fl. Ind., ii. p. 97; Wight, Ic. Pl. Ind. Or., t. 567.
Ptychotis roxburghiana, DC.; Miq., Fl. Ind. Bat., i. 1, p. 737.

Timor Laut.—This is cultivated throughout India, and in some parts of the Archipelago, but it is not known where it is indigenous. It is probably a cultivated state of some other species.

ARALIACEÆ.

Delarbrea sp.

Timor Laut.—There are two described species of *Delarbrea*, both restricted to New Caledonia, unless this be the same as one of them, and, as far as the material goes, it is so like *Delarbrea paradoxa*, Vieill. (Ann. Sci. Nat., sér. 5, iii. p. 234), that it may be the same species.

Panax sp.

Timor Laut.—Probably only a variety of *Panax pinnatum*, Lam., which has a wide range in the Malayan Peninsula and Archipelago. The genus has a very wide range in the Old World southward to New Zealand.

Heptapleurum venulosum, Seem.

Heptapleurum venulosum, Seem., Rev. Heder., p. 44; Hook. f., Fl. Brit. Ind., ii. p. 729; Benth., Fl. Austr., iii. p. 384.
Paratropia elliptica, Miq., Fl. Ind. Bat., i. 1, p. 756.

Arrou?—Widely dispersed in Tropical Asia, and extending to North Australia.

Polyscias sp. ?

ARROU and BABAR.—The genus *Polyscias* was founded by Forster on a Tana Island plant, which also occurs in Sumatra, and is the *Eupteron* of Miquel. Altogether, about eight species are known, and they inhabit India and the Archipelago, the Mascarene, and some of the Pacific Islands.

GAMOPETALÆ.

RUBIACEÆ.

Oldenlandia paniculata, Linn.

Oldenlandia paniculata, Linn.; Miq., Fl. Ind. Bat., ii. p. 191; Hook. f., Fl. Brit. Ind., iii. p. 69; Seem., Fl. Vit., p. 126.

ARROU; TIMOR LAUT.—Generally diffused in Tropical Asia, and in many of the islands of Polynesia, but not recorded from Australia. *Oldenlandia* is a large genus, chiefly Asiatic, but spread all over the tropics.

Ophiorrhiza n. sp. ?

ARROU.—This genus is a large one, and spread over the warmer parts of Asia and Australia, and it is also represented in Polynesia.

Mussænda sp.

DAMMAR.—*Mussænda* comprises about forty species, generally diffused in Tropical Asia and Africa, as well as Polynesia, yet apparently not represented in Australia.

Webera dallachiana, F. Muell.

Webera dallachiana, F. Muell.; Benth., Fl. Austr., iii. p. 412.

KI.—Elsewhere only recorded from Albany Island and Rockingham Bay, Queensland.

Randia sp.

TIMOR LAUT.—A genus of general distribution in tropical countries, several of the species inhabiting maritime districts.

Guettarda speciosa, Linn.

Guettarda speciosa, Linn.; Miq., Fl. Ind. Bat., ii. p. 262; Benth., Fl. Austr., iii. p. 419; Hook. f., Fl. Brit. Ind., iii. p. 126; Seem., Fl. Vit., p. 131; Nadeaud, Enum. Pl. Tahiti, p. 52.

ARROU; KI.—An exceedingly common tree in tidal forests in the Old World and Polynesia; it also grows some places inland, and is sometimes cultivated for the sake of its sweet-scented flowers. With the exception of the western coast of Tropical Africa, it is found on nearly all tropical coasts in the Old World; and it is found on most islands,

including the coral islands of Polynesia. It is common in the Seychelles; Dr Coppinger collected it in Poivre Island, Amirante group, and Wilford collected it in Pratas Island in the Chinese Sea, and there is a note accompanying his specimen in the Kew Herbarium to the effect that it formed the greater part of the vegetation of the island. Darwin collected it in the Keeling or Cocos Islands, and it is in the Kew Herbarium from Pitcairn, Elizabeth, and other remote islands of Polynesia. Seemann states that it is common on the sea-beaches of the Fijis, and it appears to be in almost every island of the Society, Tongan, and other Polynesian groups. It is, however, not recorded from the Sandwich Islands, nor from the Galapagos; nor have we seen any American specimens. The seed-vessel is light and fibrous, and easily conveyed by the waves of the sea; and it is among the drift fruits and seeds collected by Mr Moseley.

Ixora grandifolia, Zoll. and Morr.

Ixora grandifolia, Zoll. and Morr., Syst. Verz., p. 65; Hook. f., Fl. Brit. Ind., iii. p. 143.

Arrou; Timor Laut.—Andaman and Nicobar Islands to Malacca, Penang, and Singapore, and throughout the Archipelago.

In the Flora of British India, *Pavetta macrophylla*, Blume, and *Pavetta teysmanniana* and *Pavetta macrocoma*, Miq. (Fl. Ind. Bat., ii. p. 267–274), are regarded as varieties of this species, as also *Ixora arborescens*, Hassk.

Besides the following species of this genus, there are imperfect specimens of at least half-a-dozen others in the Kew Herbarium from the Eastern Moluccas. As limited in the Flora of British India, the genus comprises upwards of one hundred species, a very few of which are American.

Ixora timorensis, Dene.

Ixora timorensis, Dene.; Benth., Fl. Austr., iii. p. 415; Miq., Fl. Ind. Bat., ii. p. 278 (sub *Pavetta*).

Timor Laut.—This has been collected in several localities in North Australia and Queensland, as well as in Timor.

Ixora paludosa, Miq.?

Ixora paludosa, Miq.? Fl. Ind. Bat., ii. p. 271 (sub *Pavetta*).

Timor Laut.—A native of Java and Sumatra, growing near the coast.

Pavetta indica, Linn.

Pavetta indica, Linn.; Miq., Fl. Ind. Bat., ii. p. 275; Hook. f., Fl. Brit. Ind., iii. p. 150.
Ixora pavetta, Roxb., Fl. Ind., i. p. 385; Fl. Austr., iii. p. 414.

Arrou; Timor Laut.—Throughout Tropical Asia, and in many localities in North-East Australia.

Coffea bengalensis, Roxb.

Coffea bengalensis, Roxb.; Hook. f., Fl. Brit. Ind., iii. p. 153.
Coffea horsfieldiana, Miq., Fl. Ind. Bat., ii. p. 308.

BABAR.—This tree ranges from the tropical parts of the Himalayas to Java and the present island. There is about a score of species of this genus in Tropical Africa and Asia, besides the coffee-yielding species *Coffea arabica* and *Coffea liberica*.

Since the appearance of the third volume of Oliver's Flora of Tropical Africa, Mr Hiern has published an elaborate monograph of the African species in the Transactions of the Linnean Society, Botany, N. S., i. p. 169.

Morinda citrifolia, Linn.

Morinda citrifolia, Linn.; Miq., Fl. Ind. Bat., ii. p. 242; Benth., Fl. Austr., iii. p. 423; Seem., Fl. Vit., p. 129; Hook. f., Fl. Brit. Ind., iii. p. 155; H. Mann in Proc. Amer. Acad., vii. p. 170; Nadeaud, Enum. Pl. Tahiti, p. 52; Jouan in Mém. Soc. Sci. Nat. Cherbourg, 1865, xi. p. 111.

MARU; MOA.—Generally diffused both on the coast and inland in Tropical Asia, Africa, and Polynesia; also occurring in North Australia.

The various economic applications of different parts of this tree may partly account for its very wide distribution, though Jouan expresses the opinion that its distribution in Polynesia is due to oceanic currents carrying its fruit from island to island. It is a composite or multiple pulpy fruit, containing a number of very hard one-seeded pyrenes. Jouan states that it is found "*sur toutes les îles du Grand-Océan entre les tropiques, le plus souvent au bord de la mer et sur les flancs des côteaux peu élevés;*" and there are specimens from a large number of the islands in the Kew Herbarium. Mann indicates it as a plant probably introduced by the aborigines in the Sandwich Islands; and this view is supported by the fact that it is known, according to Jouan, by the same name, "Noni," in the Marquesas and the Sandwich Islands, and by the very similar name "Nono" in Tahiti. It bears the name of "Kura" in the Fijis. An allied species, *Morinda forsteri*, Seem., ranges through the South Pacific Islands from the Fijis to Pitcairn Island. Genus generally spread over the tropics.

Morinda bracteata, Roxb.

Morinda bracteata, Roxb.; Miq., Fl. Ind. Bat., ii. p. 243; Hook. f., Fl. Brit. Ind., iii. p. 156 (var. *Morindæ citrifoliæ*).

KI; TIMOR LAUT.—This species is common wild, and is cultivated in various parts of India and Ceylon, and throughout the Archipelago, but it has not been found in Australia.

Psychotria spp.

ARROU; KI; TIMOR LAUT.—Of this vast genus (about 500 species are known), four or five species were collected; but the specimens were not identified with described species, and they are insufficient for determination or description.

COMPOSITÆ.

Vernonia cinerea, Less.

Vernonia cinerea, Less.; Benth., Fl. Austr., iii. p. 459; Miq., Fl. Ind. Bat., ii. p. 11; Hook. f., Fl. Brit. Ind., iii. p. 233; Oliver, Fl. Trop. Afr., iii. p. 275.
Vernonia diffusa, Dene., Herb. Timor. Descr., p. 80, *non* Less.
Vernonia erigeroides, DC., Prodr., v. p. 25; Miq., Fl. Ind. Bat., ii. p. 13.

Arrou; Timor Laut; Babar; Wetter.—Generally spread in the tropical regions of the Old World. An exceedingly variable plant, and a somewhat anomalous species of the genus, which comprises about 400 species spread nearly all over the tropics, though only the present species has been found in Australia. The original *Vernonia diffusa*, Dene., is a very distinct form, but we follow Bentham in reducing it to *Vernonia cinerea*.

Vernonia chinensis, Less.

Vernonia chinensis, Less.; Miq., Fl. Ind. Bat., ii. p. 18; Hook. f., Fl. Brit. Ind., iii. p. 235.
Cyanopis pubescens, DC., Prodr., v. p. 69.

Timor Laut.—This species ranges from Pegu, China, and the Philippines through the Malayan Archipelago. It is also recorded from the Marianne Islands.

Adenostemma viscosum, Forst. var.

Adenostemma viscosum, Forst. var.; Miq., Fl. Ind. Bat., ii. p. 23; Benth., Fl. Austr., iii. p. 462; Hook. f., Fl. Brit. Ind., iii. p. 242; Seem., Fl. Vit., p. 140.

Arrou; Ki.—This annual herb is almost everywhere in warm countries, but especially abundant in the Old World. It is very variable, and should, according to Bentham, include all the Old World forms of the genus published as species by De Candolle.

Ageratum conyzoides, Linn.

Ageratum conyzoides, Linn.; Benth., Fl. Austr., iii. p. 462; Miq., Fl. Ind. Bat., ii. p. 23; Hook. f., Fl. Brit. Ind., iii. p. 243; Seem., Fl. Vit., p. 140.

Arrou.—Also an annual, and common throughout the tropics, including many of the Polynesian Islands; yet probably of American origin, as are all the other species of the genus.

Blumea laciniata, DC.

Blumea laciniata, DC.; Hook. f., Fl. Brit. Ind., iii. p. 264.
Conyza runcinata, Wall.; Miq., Fl. Ind. Bat., ii. p. 46.
Blumea runcinata, DC., et *Blumea sonchifolia*, DC., Prodr., v. p. 436.

Letti.—Throughout India, the warmer parts of China, the Philippines, and the Archipelago. *Blumea* comprises upwards of sixty species, spread over the warmer parts of Asia, Africa, and Australia.

Blumea lacera, DC. var.

Blumea lacera, DC. var.; Benth., Fl. Austr., iii. p. 526; Hook. f., Fl. Brit. Ind., iii. p. 263; Oliver, Fl. Trop. Afr., iii. p. 322.
Conyza lacera, Burm.; Miq., Fl. Ind. Bat., ii. p. 42.

Timor Laut; Babar.—Almost universal in the tropics of the Old World.

Blumea membranacea, DC.

Blumea membranacea, DC.; Hook. f., Fl. Brit. Ind., iii. p. 265.
Conyza membranacea, Wall.; Miq., Fl. Ind. Bat., ii. p. 49.

Timor Laut.—A variable plant, common throughout India and the Archipelago.

Blumea balsamifera, DC.

Blumea balsamifera, DC.; Hook. f., Fl. Brit. Ind., iii. p. 270.
Conyza balsamifera, Linn., et *Conyza appendiculata*, Blume; Miq., Fl. Ind. Bat., ii. pp. 55 et 56.

Maru; Babar.—Widely dispersed in Tropical Asia.

Blumea wightiana, DC.

Blumea wightiana, DC.; Hook. f., Fl. Brit. Ind., iii. p. 261; Oliver, Fl. Trop. Afr., iii. p. 323 (sub *Blumea lacera*).
Conyza lactucæfolia, Wall.; Miq., Fl. Ind. Bat., ii. p. 48.

Babar.—Common in Tropical Asia and Tropical Africa, and also occurring in Australia, according to Hooker, though it is not included in Bentham's Flora Australiensis.

Pluchea indica, Less.

Pluchea indica, Less.; Benth., Fl. Austr., iii. p. 527; Hook. f., Fl. Brit. Ind., iii. p. 272.
Conyza indica, Blume; Miq., Fl. Ind. Bat., ii. p. 58.

Timor Laut.—A salt-marsh plant, ranging from China and the Sunderbunds, in India, to North Australia. The genus *Pluchea* comprises about thirty species spread over the warmer parts of Asia, Africa, America, and Australia.

Wedelia biflora, DC.

Wedelia biflora, DC.; Benth., Fl. Austr., iii. p. 539; Hook. f., Fl. Brit. Ind., iii. p. 306; Oliver, Fl. Trop. Afr., iii. p. 376.
Wollastonia biflora, DC., et *Wollastonia scabriuscula*, DC.; Miq., Fl. Ind. Bat., ii. pp. 70 et 71.

Moa; Timor Laut.—A common seaside plant in the tropical regions of the Old World. De Candolle records it from the Marianne Islands. There are between forty and fifty species of *Wedelia*, mostly American.

Bidens pilosa, Linn.

Bidens pilosa, Linn.; Benth., Fl. Austr., iii. p. 543; Miq., Fl. Ind. Bat., ii. p. 76; Hook. f., Fl. Brit. Ind., iii. p. 309; Seem., Fl. Vit., p. 143.

ARROU; TIMOR LAUT.—Generally spread in warm countries, including many of the islands of Polynesia. *Bidens bipinnata*, Linn., reduced by Hooker to a variety of the present species, also occurs in Timor Laut. *Bidens* is a considerable genus, and the species are spread over all tropical, and nearly all temperate regions.

Emilia sonchifolia, DC.

Emilia sonchifolia, DC.; Miq., Fl. Ind. Bat., ii. p. 101; Hook. f., Fl. Brit. Ind., iii. p. 336; Oliver, Fl. Trop. Afr., iii. p. 405.

TIMOR LAUT.—Common throughout India, "but no specimen seen from the Malay Peninsula" (Hooker); also in Tropical Africa, and in America, where it is probably a colonist. There are three or four other species of the genus which are all in Tropical Asia, and one extends to Australia.

GOODENOVIEÆ.

Scævola kœnigii, Vahl.

Scævola kœnigii, Vahl; Benth., Fl. Austr., iv. p. 86; Miq., Fl. Ind. Bat., ii. p. 580, *pro parte*; Hook. f., Fl. Brit. Ind., iii. p. 421; Seem., Fl. Vit., p. 145; Nadeaud, Enum. Pl. Tahiti, p. 50.

ARROU; TIMOR LAUT; LETTI; LAKOR.—A maritime shrub, common on the shores of Tropical Asia, North Australia, and Polynesia. Nadeaud, however, states that it did not exist in Tahiti in his time, and Mann does not include this species in his enumeration of the plants of the Sandwich Islands (Proceedings of the American Academy of Arts and Sciences, vii. p. 187); but Seemann records it from the Sandwich Islands, and, if we include *Scævola sericea*, Forst., which is probably only a hairy state of *Scævola kœnigii*, and a parallel instance of what occurs in the West Indian maritime genus *Borrichia* (see Part I., p. 45), it is plentiful there.

The genus *Scævola* comprises about sixty species, whereof fifty occur in Australia, where forty-nine of them are endemic. A few species are restricted to Polynesia, chiefly to the Sandwich Islands; and there is one species, *Scævola lobelia*, Linn., which is common on the sea-shores of Tropical Asia, Africa, and America, and also occurs in the Galapagos, and in the Bermudas, but neither in Australia nor in Polynesia.

PLUMBAGINEÆ.

Ægialitis annulata, R. Br.

Ægialitis annulata, R. Br.; Benth., Fl. Austr., iv. p. 266; Miq., Fl. Ind. Bat., ii. p. 995.

ARROU.—A shrub of remarkably different aspect from all the other members of the order, inhabiting mangrove swamps in Timor and North-eastern Australia. There is a

second species or variety, which grows in similar situations in Bengal and the Malayan Peninsula.

Plumbago zeylanica, Linn.

Plumbago zeylanica, Linn.; Benth., Fl. Austr., iv. p. 267; Miq., Fl. Ind. Bat., ii. p. 994; Hook. f., Fl. Brit. Ind., iii. p. 480; Seem., Fl. Vit., p. 194; Nadeaud, Enum. Pl. Tahiti, p. 48; Mann in Proc. Amer. Acad., vii. p. 189.

Ki; Tenimber; Letti.—This plant is now generally spread in Tropical Asia, Africa, and Australia, and in some of the Polynesian Islands; but as it is very commonly cultivated for ornament, its range may have considerably widened by this means. Nadeaud cites a Tahitian name for it; and Mann states that the acrid juice is used by the natives of the Sandwich Islands for tattooing. There are about ten species of the genus, spread over the warmer parts of both hemispheres, and extending to the Cape of Good Hope in the south, and Southern Europe and Central Asia in the north. *Plumbago scandens* is almost everywhere in the warmer parts of America.

MYRSINEÆ.

Mæsa nemoralis, A. DC.?

Mæsa nemoralis, A. DC.? Prodr., viii. p. 79; Seem., Fl. Vit., pp. 148 et 430.

Timor Laut; Babar.—The true *Mæsa nemoralis* has been collected in New Caledonia, the New Hebrides, the Tongan Islands, and the Solomon and Samoan groups.

Imperfect specimens of several other species were collected in Timor Laut.

SAPOTACEÆ.

Mimusops kauki, Linn.

Mimusops kauki, Linn.; Hook. f., Fl. Brit. Ind., iii. p. 549; Miq., Fl. Ind. Bat., ii. p. 1042.

Timor Laut.—The Malayan Peninsula and Archipelago, and also in Tropical Australia, if *Mimusops browniana*, Benth. (Fl. Austr., iv. p. 285), be regarded as the same species. Genus widely spread in warm regions.

EBENACEÆ.

Diospyros maritima, Blume.

Diospyros maritima, Blume, Hiern. Ebenaceæ, p. 211.
Cargillia laxa, R. Br., Prodr. Fl. N. Holl., p. 526; Benth., Fl. Austr., iv. p. 287.
Cargillia maritima, Hassk., Cat. Pl. Hort. Bot. Bogor., ii. p. 159; Miq., Fl. Ind. Bat., ii. p. 1049.

Ki; Larat; Timor Laut; Moa.—A sea-coast tree, ranging from Java to Timor and North Australia.

There are imperfect specimens of another species in Mr Moseley's Arrou collection. The genus *Diospyros* comprises upwards of 150 species spread over all tropical countries, and a few extending into north temperate regions in Japan, South Europe, and North America.

OLEACEÆ.

Jasminum sambac, Ait.

Jasminum sambac, Ait.; Miq., Fl. Ind. Bat., ii. p. 542; Hook. f., Fl. Brit. Ind., iii. p. 591.

ARROU.—Widely dispersed in Tropical Asia, where, however, as elsewhere in the tropics, it is commonly cultivated. There are nearly a hundred species of the genus, spread over the warmer parts of the Old World; one species reaching the south of Europe.

Jasminum didymum, Forst.

Jasminum didymum, Forst.; Benth., Fl. Austr., iv. p. 294; Seem., Fl. Vit., p. 154; Nadeaud, Enum. Pl. Tahiti, p. 55.
Jasminum parviflorum, Dcne., Herb. Timor. Descr., p. 77; Miq., Fl. Ind. Bat., ii. p. 531.

TIMOR LAUT.—Java to Northern Australia; also in New Caledonia, Tahiti, and the Fijis.

Jasminum lancifolium, Dcne. ?

Jasminum lancifolium, Dcne.? Herb. Timor. Descr., p. 76; Miq., Fl. Ind. Bat., ii. p. 539.

KI.—Only seen elsewhere from Timor.

Linociera ramiflora, DC.

Linociera ramiflora, DC., Prodr., viii. p. 297.
Chionanthus ramiflora, Roxb., Fl. Ind., i. p. 107; Benth., Fl. Austr., iv. p. 301; Miq., Fl. Ind. Bat., ii. p. 551.

KI.—Tenasserim and the Philippines, to North-east Australia. Clarke (in Hook. f., Fl. Brit. Ind., iii. p. 611) makes this a variety of *Linociera macrophylla*, Wall., thus extending its range northward to the Himalayas. *Linociera* numbers nearly forty species, inhabiting the tropical regions of both hemispheres.

APOCYNACEÆ.

Rauwolfia amsoniæfolia, A. DC.

Rauwolfia amsoniæfolia, A. DC., Prodr., viii. p. 338.

KI; TIMOR LAUT; MARU.—Philippines, and probably some of the intermediate islands. *Rauwolfia* numbers nearly forty species, which inhabit Tropical America, Asia, Africa, and South Africa.

Cerbera odollam, Gærtn.

Cerbera odollam, Gærtn.; Benth., Fl. Austr., iv. p. 306; Miq., Fl. Ind. Bat., ii. p. 413; Hook. f., Fl. Brit. Ind., iii. p. 638.
Cerbera lactaria, Hamilt.; Seem., Fl. Vit., p. 638.

Arrou; Ki; Moa; Dia.—A small tree inhabiting the coast region and salt-marshes of Tropical Asia, Australia, and many of the islands of Polynesia, including the New Hebrides, the Tongan and Fiji Islands, and the Isle of Pines, near New Caledonia. The large fibrous seed-vessel of this and the three or four other species of the genus, which are also sea-shore trees, floats on the water, and is diffused by oceanic currents. It is in the collection of drift fruits and seeds made by Mr Moseley.

Ochrosia borbonica, Gmel.?

Ochrosia borbonica, Gmel.? Hook. f., Fl. Brit. Ind., iii. p. 638.

Arrou.—Imperfect specimens of an *Ochrosia*, probably of this species, which inhabits the tidal forests of the Andaman Islands, Singapore, Java, Ceylon, the Seychelles and Mascarene Islands. Another species was collected in Timor Laut, perhaps the Australian *Ochrosia elliptica*, Labill. There are about a dozen species in the region indicated, some of them extending to the Pacific Islands. Darwin collected one species, *Ochrosia parviflora*, Henslow, in the Keeling Islands, and the same one has since been found in Tahiti, the Ellice, Samoan, and Fiji groups.

Plumeria acutifolia, Poir.

Plumeria acutifolia, Poir.; Miq., Fl. Ind. Bat., ii. p. 426; Hook. f., Fl. Brit. Ind., iii. p. 641.

Ki.—A tree of American origin, now commonly cultivated and widely naturalised in India and the Archipelago. The genus, which numbers from thirty to forty species, is wholly American, though several species are now colonised in the Old World.

Tabernæmontana parviflora, Dene.

Tabernæmontana parviflora, Dene., Herb. Timor. Descr., p. 51.
Tabernæmontana decaisnei, DC., Prodr., viii. p. 369; Miq., Fl. Ind. Bat., ii. p. 420.

Ki; Lakor; Timor Laut; Dammar; Moa; Letti; Babar.—Bentham (Fl. Austr., iv. p. 311) regards this as a form of *Tabernæmontana orientalis*. There are upwards of 100 species of this genus, spread over the warmer regions of both hemispheres.

Tabernæmontana orientalis, R. Br. var.

Tabernæmontana orientalis, R. Br. var.; Benth., Fl. Austr., iv. p. 311; Seem., Fl. Vit., p. 159, excl. syn. *Tabernæmontana cumingiana*, DC., *fide* Benth.

Timor Laut.—A sea-coast tree or shrub found on the shores of New South Wales, Queensland, North Australia, the Fijis, and other Pacific Islands.

Tabernæmontana floribunda, Blume?

Tabernæmontana floribunda, Blume?; Miq., Fl. Ind. Bat., ii. p. 421.

Arrou; Ki.—Miquel only records this species from the mountainous parts of Java.

Alstonia spectabilis, R. Br.?

Alstonia spectabilis, R. Br.? Miq., Fl. Ind. Bat., ii. p. 437; Dene., Herb. Timor. Descr., p. 50.

Timor Laut.—Founded on Timor specimens. A fragment of another species was collected in Ki, and a second species, probably *Alstonia macrophylla*, in Timor Laut. The latter ranges from Penang and the Philippines to Timor. *Alstonia* is restricted to Tropical Asia and Australia, and the Pacific Islands; about thirty species being known.

Lyonsia sp.?

Arrou; Timor Laut.—About twelve other species of *Lyonsia* are known, ten of them being restricted to Australia; one is endemic in the Fijis, and one in New Caledonia.

Parsonsia spiralis, Wall.

Parsonsia spiralis, Wall.; Hook. f., Fl. Brit. Ind., iii. p. 650.
Heligme javanica, Blume; Miq., Fl. Ind. Bat., ii. p. 429.
Heligme rheedii, Wight, Ic. Pl. Ind. Or., t. 1303; Rheede, Hort. Malab., ix. t. 10.
Spirostemon spiralis, Griff., Notul., iv. p. 80, et Ic. Pl., t. 411, fig. 1.
Aganosma concanensis, Hook., Ic. Pl., t. 841.

Arrou; Babar.—A twining shrub, common from Silhet and China to Singapore, and occurring in many of the islands of the Archipelago; also in the Indian Peninsula from Concan southward, and Ceylon. Wallich gave names to four Indian forms which are all treated as one species, without even varietal rank, in the Flora of British India. There are about ten other species of the genus inhabiting Australia, New Caledonia, and New Zealand. *Parsonsia* is the only genus of the order represented in the last-named country, where there are two species.

Wrightia calycina, A. DC.?

Wrightia calycina, A. DC.? Miq., Fl. Ind. Bat., ii. p. 433.

Timor Laut.—This species appears to be restricted to the Archipelago. Miquel includes *Wrightia tinctoria*, Dene. (Herb. Timor. Descr., p. 51), but not of R. Brown, in it. The genus ranges from Australia to the Himalayas.

Anodendron paniculatum, A. DC.

Anodendron paniculatum, A. DC.? Miq., Fl. Ind. Bat., ii. p. 454; Hook. f., Fl. Brit. Ind., iii. p. 668; Wight, Ic. Pl. Ind. Or., t. 1309; Rheede, Hort. Malab., ix., t. 8.

Moa.—This gigantic climber ranges from Concan to Ceylon and Silhet, and the Philippines to Timor. *Anodendron* is a small genus restricted to Tropical Asia.

ASCLEPIADEÆ.

Calotropis gigantea, R. Br.

Calotropis gigantea, R. Br.; Hook. f., Fl. Brit. Ind., iv. p. 17; Miq., Fl. Ind. Bat., ii. p. 481; Rumph., Herb. Amb., vii. p. 24, t. 14, fig. 1.

Lakor; Timor Laut; Letti.—Common throughout India, from the Punjab to Assam, Ceylon, and Singapore; also in South China and in the Archipelago; but hitherto not found in Australia. The root and leaves are used medicinally in Java, according to Miquel. There are two other species of the genus, which is confined to the warmer parts of Asia and Africa.

Asclepias curassavica, Linn.

Asclepias curassavica, Linn.; Benth., Fl. Austr., iv. p. 326; Hook. f., Fl. Brit. Ind., iv. p. 18; Miq., Fl. Ind. Bat., ii. p. 485; Seem., Fl. Vit., p. 161.

Arrou; Ki.—An herbaceous plant, native of the West Indies, and now spread all over the tropics, partly dispersed as a weed of cultivation, but doubtless greatly extended by means of its comose seed. *Asclepias* is a considerable genus, but the great bulk of the species are concentrated in Mexico and Temperate North America. A few occur in South America, and two at least in Africa.

Marsdenia spp.

Timor Laut; Wetter.—The genus *Marsdenia* is widely diffused in the tropics of both hemispheres, and imperfect specimens of two or three species have been collected in the Eastern Moluccas.

Hoya spp.

Arrou; Timor Laut; Babar.—Fragments of several species belonging apparently to this large tropical Asian and Australian genus are in the collections, but they have not been matched with described species, and they are too imperfect for description.

Dischidia n. sp. ?

Timor Laut.—This remarkable genus consists of about twenty-four species, generally dispersed in the tropical parts of Eastern India and the Archipelago; one common Indian species (*Dischidia nummularia*, R. Br.) ranging southward to North Australia.

Ceropegia horsfieldiana, Miq.

Ceropegia horsfieldiana, Miq., Fl. Ind. Bat., ii. p. 528.
Ceropegia curviflora, Hassk. in Bot. Zeit., 1847.

Timor Laut.—Java. Bentham (Fl. Austr., iv. p. 348) refers the *Ceropegia cumingiana* (Bot. Mag. t. 4349) to this species; the true *Ceropegia cumingiana*

inhabits the Philippines and Queensland, Australia, where it is the only species of a genus numerous in India and Africa. There are about fifty species of *Ceropegia* spread over the warmer parts of the Old World.

LOGANIACEÆ.

Gærtnera sp.

Arrou.—*Gærtnera* is a genus of about twenty-five species, inhabiting Tropical Asia and Africa, but rare in the Archipelago, and not known to be represented in Australia. The present plant may be the common *Gærtnera kænigii*, Wight, Ic. Pl. Ind. Or., t. 1318.

BORAGINEÆ.

Cordia subcordata, Lam.

Cordia subcordata, Lam.; Benth., Fl. Austr., iv. p. 385; Hook. f., Fl. Brit. Ind., iv. p. 140; Miq., Fl. Ind. Bat., ii. p. 914; Seem., Fl. Vit., p. 168, t. 34; Nadeaud, Enum. Pl. Tahiti, p. 57 Mann. in Proc. Amer. Acad., vii. p. 194.

Cordia sebestena, Forst., Fl. Ins. Austr. Prodr., p. 18; non Linn.

Cordia rumphii, Blume, Bijdr., p. 843; Rumph., Herb. Amb., ii. p. 226, t. 75.

Lakor; Timor Laut.—A very common tree in Polynesia, from the Fijis to the Sandwich Islands, and among others in the Marquesas and Society groups. It is most likely the "*Cordia sebestena*, Linn., *an potius Cordia speciosa*, Willd." of Jouan (Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 116), who states that it is usually found on the sea-shore, and expresses the opinion that the seeds are conveyed from place to place by oceanic currents. Seemann mentions that the seeds are eaten by the natives [of Fiji?], though there is not much taste in them. Nadeaud describes this as a tree of the madreporic vegetation, met with on the sea-shore, and adds that it furnishes the beautiful red dye of Tahiti. This tree is also common in the islands of the Indian Ocean, and westward to the east coast of Africa. In India it is commonly planted, and perhaps nowhere really wild; it is also found throughout the Archipelago, and on the coast of Tropical Australia. The genus *Cordia* numbers nearly 200 species, spread over the warmer regions of both hemispheres, but most numerous in America.

Ehretia sp.

Arrou; Letti.—*Ehretia* is a considerable genus, widely dispersed in the tropical regions of the Old World.

Tournefortia argentea, Linn. f.

Tournefortia argentea, Linn. f.; Benth., Fl. Austr., iv. p. 389; Miq., Fl. Ind. Bat., ii. p. 926; Hook. f., Fl. Brit. Ind., iv. p. 145; Seem., Fl. Vit., p. 171; Nadeaud, Enum. Pl. Tahiti, p. 57.

Arrou to Timor Laut.—A common seaside shrub on nearly all coasts, insular and continental, of the Indian and Pacific Oceans, at least in the warmer parts. Seemann records

it as common on the sea-beach of nearly all the Fiji Islands; and its area embraces the Society and Marianne Islands. Nadeaud says it is a common shrub on most coral islands; but that it had become very rare in Tahiti, where it is destined to be extirpated. There are specimens in the Kew Herbarium from Ducie Island, collected by Cuming and J. T. Arundel; the latter says: "The commonest thing on all these low islands, generally growing by the sea, and sometimes quite large." There are also specimens from the Ellice, Union, and Gilbert groups, collected by the Revs. J. Whitmee and T. Powell, with memoranda to the effect that it is one of the characteristic features of the vegetation; and from several small islands in the Indian Ocean, as Bird, Cerf, and Poivre Islands. Several other species of the genus are littoral in tropical and subtropical regions, both in America and the Old World.

Tournefortia sarmentosa, Lam.

Tournefortia sarmentosa, Lam.; Benth., Fl. Austr., iv. p. 390; Miq., Fl. Ind. Bat., ii. p. 927; Dene., Herb. Timor. Descr., p. 66.

ARROU; KI; TIMOR LAUT.—This species ranges from the Philippines to North Australia; it also occurs in the Mauritius and Seychelles, but does not appear to extend to Polynesia.

Heliotropium indicum, Linn.

Heliotropium indicum, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 152; Griseb., Fl. Brit. W. Ind., p. 485; F. Muell., Syst. Census Austr. Pl., p. 100.
Heliophytum indicum, DC.; Miq., Fl. Ind. Bat., ii. p. 925.

LETTI.—An annual, now almost everywhere in the tropics. *Heliotropium* is a genus of more than 100 species, which are generally diffused in the warmer regions of both hemispheres, and extend into some temperate regions.

CONVOLVULACEÆ.

Ipomœa angustifolia, Jacq.

Ipomœa angustifolia, Jacq., Ic. Pl. Rar., t. 317, not of Choisy; Benth., Fl. Austr., iv. p. 425; Hook. f., Fl. Brit. Ind., iv. p. 205.
Ipomœa filicaulis, Blume; Miq., Fl. Ind. Bat., ii. p. 603.

TIMOR LAUT.—An annual species widely dispersed in Tropical Asia, Africa, and Australia. Miquel records it from the "tropische gewesten der geheele aarde," but we have seen no American specimen.

As now usually limited, *Ipomœa* numbers between 300 and 400 species, generally diffused in warm regions, but very rare or quite absent in temperate and cold countries.

Ipomœa vitifolia, Sweet.

Ipomœa vitifolia, Sweet; Miq., Fl. Ind. Bat., ii. p. 607; Hook. f., Fl. Brit. Ind., iv. p. 213.

TIMOR LAUT.—Throughout India, except the dry north-west, from Sikkim, Assam, Chittagong, and Burmah, southward to Ceylon and Malacca, and the Archipelago.

Ipomœa hederacea, Jacq.

Ipomœa hederacea, Jacq.; Benth., Fl. Austr., iv. p. 416; Hook. f., Fl. Brit. Ind., iv. p. 199; Hemsl. in Godm. et Salv. Biol. Centr.-Am., ii. p. 387.
Pharbitis nil et *Pharbitis hederacea*, Choisy in DC. Prodr., ix. pp. 343, 344; Miq., Fl. Ind. Bat., ii. pp. 595, 596.

TIMOR LAUT.—Now generally dispersed in tropical and some subtropical regions, where, however, it is also widely cultivated for its ornamental character.

Ipomœa turpethum, R. Br.

Ipomœa turpethum, R. Br.; Benth., Fl. Austr., iv. p. 418; Hook. f., Fl. Brit. Ind., iv. p. 212; Miq., Fl. Ind. Bat., ii. p. 606; Seem., Fl. Vit., p. 172; Nadeaud, Enum. Pl. Tahiti, p. 58.

TIMOR LAUT.—Generally dispersed from the Himalayas and Formosa, through the islands of the Indian Ocean, the Indian Archipelago, to North Australia, and many of the Pacific Islands. It seems to flourish equally well inland and on the sea-shore.

Ipomœa glaberrima, Bojer.

Ipomœa glaberrima, Bojer in Hook. Journ. Bot., i. p. 357; Baker, Fl. Maurit., p. 211.
• *Calonyction comosperma*, Bojer, Hort. Maurit., p. 228; DC., Prodr., ix. p. 346; Seem., Fl. Vit., p. 171.

TIMOR LAUT.—This species inhabits Eastern Africa, Madagascar, the Seychelles, and the Fiji and other islands, often growing on the sea-shore.

Ipomœa cymosa, Rœm. et Schult.

Ipomœa cymosa, Rœm. et Schult.; Benth., Fl. Austr., iv. p. 423; Miq., Fl. Ind. Bat., ii. p. 613; Hook. f., Fl. Brit. Ind., iv. p. 211; Baker, Fl. Maurit., p. 208; Rumph., Herb. Amb., v. t. 158.

TIMOR LAUT.—Generally dispersed in Tropical Asia, and extending to Africa and North Australia, including many of the intervening islands. It is recorded as being common in Mahé, Seychelles, both near the shore and on the tableland.

Ipomœa biloba, Forsk.

Ipomœa biloba, Forsk., Fl. Æg.-Arab., p. 44; Clarke in Hook. f., Fl. Brit. Ind., iv. p. 212.
Ipomœa pes-capræ, Sweet; Benth., Fl. Austr., iv. p. 419; Miq., Fl. Ind. Bat., ii. p. 602; Seem., Fl. Vit., p. 172; Nadeaud, Enum. Pl. Tahiti, p. 58; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 116, 136, et 148; Mann in Proc. Amer. Acad., vii. p. 195.

ARROU; LAKOR.—This plant grows almost everywhere on sandy coasts in tropical and subtropical regions, binding the sands with its strongly developed root-system. Jouan states that it is one of the first plants to invade the corals islets, and that its seeds are impervious to the action of sea-water. See Part II., p. 80.

Hewittia bicolor, Wight.

Hewittia bicolor, Wight; Hook. f., Fl. Brit. Ind., iv. p. 216; Miq., Fl. Ind. Bat., ii. p. 620.
Ipomœa timorensis, Blume, Bijdr., p. 711.

TIMOR LAUT.—This perennial herb ranges from Assam and the Philippines to Timor, and it is common in Tropical and South Africa, but it does not appear to reach the South Pacific Islands, nor Australia, nor the Mascarene Islands. *Hewittia* is a monotypic genus.

Convolvulus parviflorus, Vahl.

Convolvulus parviflorus, Vahl; Miq., Fl. Ind. Bat., ii. p. 622; Benth., Fl. Austr., iv. p. 430; Hook. f., Fl. Brit. Ind., iv. p. 220.

TIMOR LAUT.—Widely dispersed in Tropical Asia, and extending to Australia. It is also recorded from Tropical Africa in the Flora of British India, but we have seen no specimens from that country. The species of *Convolvulus*, of which there are nearly 150, mostly inhabit temperate and subtropical regions, and they are especially numerous in the Mediterranean region.

Cuscuta reflexa, Roxb. var.?

Cuscuta reflexa, Roxb. var.? Hook. f., Fl. Brit. Ind., iv. p. 225; Miq., Fl. Ind. Bat., ii. p. 631; Dene., Herb. Timor. Descr., p. 66.

WETTER.—The true *Cuscuta reflexa* is common throughout India, from the sea-level to an altitude of 8000 feet, and it is also found in Timor. There are about eighty species of *Cuscuta* known, and they are very generally diffused in tropical and temperate regions, including New Zealand, where there is one endemic species.

SOLANACEÆ.

Lycopersicum esculentum, Mill.

Lycopersicum esculentum, Mill.; Miq., Fl. Ind. Bat., ii. p. 635; Rumph., Herb. Amb., v. t. 154.

ARROU; MARU; TIMOR LAUT.—The Tomato, a native of America, is now naturalised in many other tropical countries.

Solanum indicum, Linn.

Solanum indicum, Linn.; Miq., Fl. Ind. Bat., ii. p. 651; Hook. f., Fl. Brit. Ind., iv. p. 234.

KI.—Common throughout Tropical India, and extending to China and the Philippines, and southward to the Eastern Moluccas. Miquel also records it from Australia, but it is not included in Bentham's Flora Australiensis. *Solanum* is one of the largest genera of plants, numbering, according to a very moderate estimate, at least 700 species. They are mostly inhabitants of tropical regions, though a few species extend to both north and south temperate countries.

Solanum verbascifolium, Linn.

Solanum verbascifolium, Linn.; Miq., Fl. Ind. Bat., ii. p. 640; Hook. f., Fl. Brit. Ind., iv. p. 230; Benth., Fl. Austr., iv. p. 449; Griseb., Fl. Brit. W. Ind., p. 438.

Ki; Timor Laut.—Widely dispersed in Tropical Asia and America; also found in Eastern Tropical Australia, but not recorded from Africa.

Solanum torvum, Swartz var.

Solanum torvum, Swartz var.; Miq., Fl. Ind. Bat., ii. p. 648; Hook. f., Fl. Brit. Ind., iv. p. 234; Griseb., Fl. Brit. W. Ind., p. 441.

Timor Laut.—This species is widely dispersed in Tropical Asia and America, but not known to us either from Africa or Australia.

Physalis minima, Linn.

Physalis minima, Linn.; Hook. f., Fl. Brit. Ind., p. 238; Miq., Fl. Ind. Bat., ii. p. 664; Benth., Fl. Austr., iv. p. 466.

Ki; Timor Laut.—An annual herb, spread nearly all over the tropics. The genus is essentially American, and especially numerous in the Mexican region. Altogether, there are from thirty to forty species, several of which, besides *Physalis minima*, are now widely diffused in the Old World.

Capsicum frutescens, Linn.

Capsicum frutescens, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 239; Miq., Fl. Ind. Bat., ii. p. 660; Seem., Fl. Vit., p. 177.

Timor Laut.—This plant, which is probably indigenous only in America, is now cultivated and naturalised in most other warm countries, as are several other species of the genus, which has, perhaps, spread from America. No species is included in Bentham's Flora Australiensis.

Datura alba, Nees.

Datura alba, Nees; Miq., Fl. Ind. Bat., ii. p. 667.
Datura fastuosa, Linn., var. *alba*, Hook. f., Fl. Brit. Ind., iv. p. 243.

Timor Laut.—Common throughout Tropical Asia, Africa, and America; but often, like most other species of the genus, existing only as a weed of cultivation.

Nicotiana tabacum, Linn.

Nicotiana tabacum, Linn.; Miq., Fl. Ind. Bat., ii. p. 671; Hook. f., Fl. Brit. Ind., iv. p. 245.

Timor Laut.—The tobacco is a native of America, but it is now cultivated and more or less naturalised in nearly all warm countries. There are between thirty and forty species of *Nicotiana*, mostly natives of America, but a few appear to be indigenous in Australia and the Pacific Islands.

SCROPHULARINEÆ.

Buchnera ramosissima, R. Br.

Buchnera ramosissima, R. Br.; Benth., Fl. Austr., iv. p. 515.
Buchnera arguta, Dene., Herb. Timor. Descr., p. 46; Miq., Fl. Ind. Bat., ii. p. 703.

MARU.—Timor and North Australia. The genus is widely spread in Tropical Asia, Africa, America, and Australia.

BIGNONIACEÆ.

Dolichandrone rheedii, Seem.

Dolichandrone rheedii, Seem., Journ. Bot., 1870, p. 380; Hook. f., Fl. Brit. Ind., iv. p. 379.
Spathodea rheedii, Wall., et *Spathodea diepenhorstii*, Miq., Fl. Ind. Bat., ii. p. 754.

DAMMAR.—Malabar and Malayan Peninsula and Archipelago, to Timor. The genus numbers about a dozen species, spread over Tropical Asia, Africa, and America.

PEDALINEÆ.

Sesamum indicum, Linn.

Sesamum indicum, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 387; Miq., Fl. Ind. Bat., ii. p. 760.

TIMOR LAUT.—This plant is cultivated, and more or less wild in most hot countries, and its home is not known with certainty, though most likely it is in some part of Asia.

Josephinia imperatricis, Vent.

Josephinia imperatricis, Vent.; Miq., Fl. Ind. Bat., ii. p. 761; Benth., Fl. Austr., iv. p. 557; Dene., Herb. Timor. Descr., p. 76, excl. syn. *Josephinia grandiflora*.

TIMOR LAUT; LETTI; MOA.—Celebes to North Australia. This plant has a seed-vessel armed with prickles. Only two other species are described, and they are endemic in Australia.

ACANTHACEÆ.

Ruellia aruensis, S. Moore.

Ruellia aruensis, S. Moore in Journ. Bot., 1878, p. 134.

ARROU.—Hitherto only known at Kew from this island, where it was collected by Mr Moseley. *Ruellia* is one of the largest genera of the Acanthaceæ, numbering about 150 species, for the greater part American, a few being scattered over the warmer parts of the Old World.

Petalidium sp.

KI.—A fragmentary specimen of a plant that may belong to this small Asiatic and African genus.

Hemigraphis reptans, T. And.

Hemigraphis reptans, T. And., MSS. in Herb. Kew.
Ruellia reptans, Forst., Fl. Ins. Austr. Prodr., p. 44; Seem., Fl. Vit., p. 183.

ARROU.—New Caledonia, New Hebrides, and Admiralty Islands. *Hemigraphis* comprises about twenty species, ranging from India, China, and Japan southward, through the Archipelago, but apparently not entering Australia.

Hemigraphis parabolica, Nees.

Hemigraphis parabolica, Nees; Blanco, Fl. Filip. Noviss. App., p. 153.
Ruellia parabolica, Nees in DC. Prodr., xi. p. 144; Miq., Fl. Ind. Bat., ii. p. 786.

ARROU.—Of this plant we have only seen Cuming's Luzon specimens, besides Moseley's from Arrou. Fragments of one or two other species apparently of this genus were collected in Arrou and Timor Laut.

Strobilanthes n. sp. ?

KI.—A genus of upwards of 120 species, mostly Indian, but generally spread in Tropical Asia and Africa.

Acanthus ilicifolius, Linn.

Acanthus ilicifolius, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 481; Benth., Fl. Austr., iv. p. 548.
Dilivaria ilicifolia, Juss.; DC. Prodr., xi. p. 268; Seem., Fl. Vit., p. 183.

ARROU; LAKOR; TIMOR LAUT.—A littoral shrub, ranging from Malabar to Ceylon and Bengal, and the Philippines to Australia and New Caledonia. Both the ordinary form and the variety *integrifolia* were collected in Timor Laut and other islands. *Acanthus* is a small genus of about fourteen species, inhabiting the Mediterranean region, and the subtropical and tropical regions of the Old World only.

Barleria prionitis, Linn.

Barleria prionitis, Linn.; Hook. f., Fl. Brit. Ind., iv. p. 482.
Prionitis hystrix et *Prionitis pubiflora*, Miq., Fl. Ind. Bat., ii. pp. 809, 810; Rheede, Hort. Malab., ix. t. 41; Rumph., Herb. Amb., vii. t. 13.

LAKOR; DAMMAR; LARAT; TIMOR LAUT and other islands.—A prickly bush, exceedingly common in Tropical Asia and Africa, though often occurring as an introduced plant, as it is sometimes planted for a fence. *Barleria* is a large tropical genus, chiefly American, and not known to be represented in Australia.

Asystasia intrusa, Blume.

Asystasia intrusa, Blume; Hook. f., Fl. Brit. Ind., iv. p. 493.
Asystasia blumei, Nees, et *Asystasia nemorum*, Nees in DC. Prodr., xi. p. 167; Miq., Fl. Ind. Bat., ii. p. 793.

ARROU; LAKOR; DIA.—Singapore and Java. The genus is exclusively Old World, and comprises about twenty species.

Eranthemum variabile, R. Br.

Eranthemum variabile, R. Br., Prodr. Fl. N. Holl., p. 477; Benth., Fl. Austr., iv. p. 555.

Timor Laut.—Common in Queensland and New South Wales, but this appears to be the first discovery of the species outside of Australia. The plant figured under this name in Paxton's Magazine of Botany, xiii. p. 75, is a distinct species. The genus is generally spread over the tropics.

Eranthemum album, Nees.

Eranthemum album, Nees; Hook. f., Fl. Brit. Ind., iv. p. 498.
Eranthemum crenulatum, Wall.; Bot. Reg., t. 879; DC., Prodr., xi. p. 453; Miq., Fl. Ind. Bat., ii. p. 836.

Arrou; Ki; Dammar.—Andamans, and Malayan Peninsula and Archipelago.

Lepidagathis hyalina, Nees var. ?

Lepidagathis hyalina, Nees var. ? Miq., Fl. Ind. Bat., ii. p. 815.

Timor Laut; Dammar; Letti.—Common in India, and extending from China through the Archipelago. About fifty species of *Lepidagathis* are known, two of which are American, and the rest Old World, chiefly Asiatic.

Lepidagathis javanica, Blume.

Lepidagathis javanica, Blume; Miq., Fl. Ind. Bat., ii. p. 813.

Arrou; Ki.—Java to Timor.

Justicia gendarussa, Linn.

Justicia gendarussa, Linn. f., Suppl., p. 85; Rumph., Herb. Amb., iv. p. 70, t. 28.
Gendarussa vulgaris, Nees in DC. Prodr., xi. p. 410; Miq., Fl. Ind. Bat., ii. p. 831.

Timor Laut; Babar.—Southern India, China, Formosa, and the Philippines through the Archipelago, but not recorded from Australia. It is also found in Madagascar, the Seychelles, Bourbon, and Mauritius; and it exists as an introduced plant in South America. *Justicia* is a genus of more than 100 species, spread over the warm regions of both hemispheres.

Graptophyllum hortense, Nees.

Graptophyllum hortense, Nees; Wall., Pl. As. Rar., iii. p. 285; DC., Prodr., xi. p. 328; Miq., Fl. Ind. Bat., ii. p. 824; T. Anders. in Journ. Linn. Soc. Lond., ix. p. 523; Dene., Herb. Timor. Descr., p. 54; Rumph., Herb. Amb., iv. t. 30.
Justicia picta, Vahl, Symb., ii. p. 14; Bot. Reg., t. 1227; Bot. Mag., t. 1870.

Arrou; Timor Laut.—This is commonly cultivated throughout Tropical Asia, as well as in other parts of the world, on account of its showy flowers, and prettily variegated

foliage. Its native country is uncertain, though doubtless somewhere in Asia. Anderson suggests that it may be indigenous in the Friendly and Fiji Islands. There are specimens of it, without variegated foliage, in the Kew Herbarium, from the former group of islands collected by Harvey, and from the latter collected by Milne; yet it is not included in Seemann's Flora Vitiensis. Milne records it as frequent on the mountains of Ovalau. Among other cultivated specimens in the Kew Herbarium are some from the West Indies, including one from Havana, from the Herbarium of Ruiz and Pavon. There are also specimens from Sierra Leone and Mauritius. The genus includes two other species, which are endemic in Australia.

Dicliptera burmanni, Nees.

Dicliptera burmanni, Nees; Miq., Fl. Ind. Bat., ii. p. 845.
Dicliptera ciliata, Dcne., Herb. Timor. Descr., p. 56, *fide* Miquelii.

Arrou; Ki; Lakor; Dammar; Letti.—China and Java to Timor. The genus is a large one, and is represented in America as well as the Old World. Two species, allied to the present one, inhabit Timor and North Australia.

Hypoestes floribunda, R. Br.

Hypoestes floribunda, R. Br., Prodr. Fl. N. Holl., p. 474; Benth., Fl. Austr., iv. p. 553 (*varietates plures*).

Timor Laut.—Common in North Australia, Queensland, and New South Wales, and very variable. Probably, as suggested by Mr Bentham, some of the Archipelago forms, described as species by Nees and others, should be referred to this. *Hypoestes* is an exclusively Old World genus, of about forty species, ranging all over Eastern Tropical Asia southward to North Australia; also the Mascarene Islands and Tropical Africa.

MYOPORINEÆ.

Myoporum acuminatum, R. Br.

Myoporum acuminatum, R. Br., Prodr. Fl. N. Holl., p. 515; Benth., Fl. Austr., v. p. 3 (*varietates plures*).

Timor Laut.—The species of *Myoporum* are mostly concentrated in Australia, with single species in New Zealand, the Sandwich Islands, the Toubouai Islands, New Caledonia, China, Japan, and the Mauritius; but, although Bentham includes the Indian Archipelago in his distribution of the genus, we have seen no specimen except the present. *Myoporum acuminatum* is one of the commoner Australian species, occurring in all the colonies, and it is closely allied to the New Caledonian *Myoporum tenuifolium*.

VERBENACEÆ.

Callicarpa cana, Linn.

Callicarpa cana, Linn.; Miq., Fl. Ind. Bat., ii. p. 885; Dene., Herb. Timor. Descr., p. 73; Benth., Fl. Austr., v. p. 56.

Timor Laut.—A shrub ranging from the Malayan Peninsula and the Philippines to North Australia. Miquel also records it from Bourbon, whence we have seen no specimens. It is, however, commonly cultivated. Bentham refers *Callicarpa eriocolona*, Schauer, and *Callicarpa bicolor*, Juss., to this species. The genus is a large one, and generally spread in warm countries.

Callicarpa longifolia, Lam. ?

Callicarpa longifolia, Lam.? Miq., Fl. Ind. Bat., ii. p. 887; Benth., Fl. Austr., v. p. 57.

Timor Laut.—Generally spread in Tropical Asia, and extending southward to North Australia.

Callicarpa pedunculata, R. Br.

Callicarpa pedunculata, R. Br., Prodr. Fl. N. Holl., p. 513; Benth., Fl. Austr., v. p. 57; Miq., Fl. Ind. Bat., ii. p. 886 (*lanata*).

Ki.—Archipelago and Eastern Australia. The three species of *Callicarpa* here enumerated are the only ones hitherto discovered in Australia.

Clerodendron inerme, R. Br.

Clerodendron inerme, R. Br., Prodr. Fl. N. Holl., p. 511; Benth., Fl. Austr., v. p. 63; Miq., Fl. Ind. Bat., ii. p. 868; Dene., Herb. Timor. Descr., p. 71; Rumph., Herb. Amb., v. t. 46.

Arrou; Timor Laut.—A common seaside shrub from India, the Philippines, and Marianne Islands, to Australia and New Caledonia. Seemann (Fl. Vit., p. 188) states that it is common on the sea-coast of all the Fiji Islands; and there are specimens in the Kew Herbarium from the Tongan, Samoan, Friendly, and other groups of islands in Polynesia; but Nadeaud does not include it in his list of Tahitian plants.

Clerodendron longiflorum, Dene. var. ?

Clerodendron longiflorum, Dene. var.? Dene., Herb. Timor. Descr., p. 72; Miq., Fl. Ind. Bat., ii. p. 884.

Timor Laut; Letti.—The typical plant is a native of Timor, and Miquel records it from Luzon. The genus *Clerodendron* is a large one, and the species are especially numerous in the Archipelago; a few are African, and a few American. Fragments of several other species were collected in the Eastern Moluccas.

Premna integrifolia, Linn.?

Premna integrifolia, Linn.? Benth., Fl. Austr., v. p. 59; Miq., Fl. Ind. Bat., ii. p. 894; Dene., Herb. Timor. Descr., p. 74.

Timor Laut.—The true *Premna integrifolia* is a common seaside shrub or tree in this region, ranging from India to North Australia. The Polynesian *Premna tahitensis*, Schauer (Seem., Fl. Vit., p. 186, t. 43), is very near this, and ranges from the Fijis to the Marquesas.

Premna obtusifolia, R. Br.

Premna obtusifolia, R. Br., Prodr. Fl. N. Holl., p. 512; Benth., Fl. Austr., v. p. 58.
Premna cyclophylla, Miq., Fl. Ind. Bat., ii. p. 899.

Larat; Wetter; Timor Laut.—Like *Premna integrifolia*, this is a littoral species, and it ranges from Java to North Australia. An imperfect specimen of another species was collected in Arrou.

Vitex trifolia, Linn.

Vitex trifolia, Linn.; Benth., Fl. Austr., v. p. 66; Miq., Fl. Ind. Bat., ii. p. 859; Dene., Herb. Timor. Descr., p. 72; Seem., Fl. Vit., p. 190; Hook. et Arn., Bot. Beech. Voyage, p. 206, t. 47 (*ovata*, Thunb.); Rumph., Herb. Amb., iv. t. 18.

Babar; Timor Laut; Letti.—A common seaside shrub in the tropics of the Old World, and extending to many of the Polynesian Islands, including the Sandwich group; yet it is not included by Nadeaud in his Énumération des Plantes Indigènes de Tahiti, nor by Jouan in his essay on the Plants of the Pacific Islands (Mém. Soc. Sci. Nat. Cherbourg, xi.) Seemann states that it is common on the sea-beach of all the Fiji Islands. It is also in Kew Herbarium from Samoa, Tonga, New Caledonia, and the New Hebrides. Baker (Fl. Maurit., p. 256) treats it as an introduced plant in Mauritius and the Seychelles; but as it also occurs in the Comoro Islands, and on the eastern coast of Africa, it has perhaps as good a claim to be regarded as indigenous in those islands, as in many other localities. It is an exceedingly variable plant in its foliage, exhibiting forms having one, three, and five leaflets respectively. In some of its variations it is not easily distinguished from *Vitex negundo*, Linn.

Vitex negundo, Linn.

Vitex negundo, Linn.; Miq., Fl. Ind. Bat., ii. p. 860; Dene., Herb. Timor. Descr., p. 72; Rumph., Herb. Amb., iv. t. 19.

Timor Laut; Maru; Babar.—Common throughout India, the warmer parts of China, and southward through the Archipelago, but apparently not reaching Australia. There are also specimens in the Kew Herbarium from Eastern Africa, Madagascar, and Mauritius, yet Baker (Fl. Maurit., p. 266) says that this species is not even naturalised in Mauritius. There is also a specimen in the Kew Herbarium from Samoa, named *Vitex*

negundo. However, this and some of the forms referred to *Vitex trifolia* are so much alike, that without a careful examination of all the specimens, the distribution of the two species—if two there be—cannot be accurately given. *Vitex bicolor*, Willd., is the same as *Vitex negundo*.

Vitex pubescens, Vahl.

Vitex pubescens, Vahl; Miq., Fl. Ind. Bat., ii. p. 861; Done., Herb. Timor. Descr., p. 73.

WETTER.—Common in Tropical India from Bengal to Ceylon, and through the Malayan Peninsula and Archipelago, but not known from Australia.

Petræovitex riedelii, Oliv.

Petræovitex riedelii, Oliv. in Hook. Ic. Pl., t. 1420.

ARROU; WETTER.—Also in Buru. A monotypic genus, as far as at present known, established on specimens recently collected in these islands.

Avicennia officinalis, Linn.

Avicennia officinalis, Linn.; Miq., Fl. Ind. Bat., ii. p. 912; Benth., Fl. Austr., v. p. 69; Baker, Fl. Maurit., p. 257.

Although there are no specimens in the Kew Herbarium of this shrub from the Eastern Moluccas eastward of Timor, it deserves to be mentioned here on account of its remarkable geographical distribution. Taking it as limited in the Flora Australiensis (that is, to include *Avicennia tomentosa*, Jacq.), it is one of the most widely diffused of littoral shrubs, inhabiting, as it does, the shores of Tropical and Subtropical Asia, Africa, America, and Australia, and extending into some temperate regions, as the Bermudas in the north, and New Zealand in the south. It is common apparently on all the coasts of Tropical Asia; on the eastern coast of Africa it ranges from the Red Sea to the Cape of Good Hope, and is also common on the western coast; in America, it is common on both the Atlantic and Pacific coasts; and it grows all round Australia, including the western side, where so very few of this class of widely dispersed plants are found. But, except New Caledonia and the Galapagos, we have no evidence that it occurs in any of the Pacific Islands. It is not mentioned by Endlicher, Seemann, Nadeaud, Jouan, Mann, or Guillemin; and there is not a single specimen in the comparatively recent and copious collections at Kew, collected by Powell, Whitmee, and others. Therefore, should it exist at all in Polynesia proper, we may assume that it is rare. This unusual distribution is not easily explained, for many of the other salt-marsh and mangrove-swamp plants with which it is associated elsewhere, abound in many of the Pacific Islands. The plant doubtfully named *Avicennia tomentosa* in Hooker and Arnott's Botany of Beechey's Voyage, p. 93, from the Sandwich Islands, is *Vitex trifolia*.

LABIATÆ.

Ocimum sanctum, Linn.

Ocimum sanctum, Linn. ; Miq., Fl. Ind. Bat., ii. p. 939 ; Benth., Fl. Austr., v. p. 74 ; Dene., Herb. Timor. Descr., p. 69.

Ki ; Timor Laut.—A perennial, generally diffused in Tropical Asia, where, however, it is commonly cultivated ; also occurring in North Australia, and in Africa. A genus of about forty species, widely spread in tropical regions, though more numerous in Africa and Brazil than in Asia.

Ocimum basilicum, Linn.

Ocimum basilicum, Linn. ; DC., Prodr., xii. p. 32 ; Miq., Fl. Ind. Bat., ii. p. 937.
Ocimum gratissimum, Seem., Fl. Vit., p. 191, non Linn.

Maru.—Widely diffused in Tropical Asia and Africa, as well as in Polynesia ; but, like the last, commonly cultivated ; and thereby, probably, its area has been considerably extended. In a manuscript note in the Kew copy of De Candolle's Prodromus, xii. p. 32, N. E. Brown says that "*Ocimum canum* is no doubt the same species as *Ocimum basilicum*, and probably the female of it, as it is not uncommon for the sexes to be separated in the Labiateæ." If this be so, the geographical area of *Ocimum basilicum* includes South America.

Plectranthus parviflorus, Willd.

Plectranthus parviflorus, Willd. ; Benth., Fl. Austr., v. p. 78 ; Mann in Proc. Amer. Acad., vii. p. 192 ; Seem., Fl. Vit., p. 192.
Plectranthus australis, R. Br., et *Plectranthus graveolens*, R. Br., *fide* Benth., *loc. cit.* ; Miq., Fl. Ind. Bat., ii. p. 947.

Timor Laut.—As limited by Bentham in the Flora Australiensis, this common Australian herb or undershrub also inhabits Timor, New Caledonia, and the Sandwich Islands. Genus large, and generally dispersed in the tropics of the Old World, but not represented in America.

Coleus scutellarioides, Benth.

Coleus scutellarioides, Benth. in DC. Prodr., xii. p. 73 ; Fl. Austr., v. p. 79 ; Miq., Fl. Ind. Bat., ii. p. 949.

Timor Laut.—Widely spread in the Archipelago, and extending to North Australia. Also collected in Java and Erromanga. *Coleus* consists of about fifty species, inhabiting the warmer parts of Asia and Africa ; the present species only extending to Australia.

Hyptis spicigera, Lam.

Hyptis spicigera, Lam.; DC., Prodr., xii. p. 87; Miq., Fl. Ind. Bat., ii. p. 958; Griseb., Fl. Brit. W. Ind., p. 487.

Timor Laut.—The distribution of this herb is somewhat remarkable, but it probably exists only as an introduced plant in some of the localities in the Old World. Thus, it has been found in the Philippines and in Madagascar; it is widely spread in Tropical Africa, and in America it ranges from the West Indies and Panama to Brazil. Bentham, Flora Australiensis, v. p. 80, seems to regard the genus as wholly American, for he says: "A very large genus, entirely American, tropical or subtropical; a few of the species are, however, now spread over various tropical regions of the Old World, especially Africa. In De Candolle's Prodromus Bentham defines 250 species, which are mostly herbaceous or at the most shrubby, though one, *Hyptis arborea*, is a tree thirty feet high.

Anisomeles salviæfolia, R. Br.

Anisomeles salviæfolia, R. Br., Prodr. Fl. N. Holl., p. 503; Benth., Fl. Austr., v. p. 89; Miq., Fl. Ind. Bat., ii. p. 976.

Ki; Timor Laut.—Timor and the northern part of Australia, but apparently never far from the sea. In the Flora Australiensis Bentham unites *Anisomeles moschata* and *Anisomeles inodora*, R. Br., with this species. A small genus restricted to Australia and Tropical Asia.

Anisomeles ovata, R. Br.

Anisomeles ovata, R. Br.; DC., Prodr., xii. p. 455; Miq., Fl. Ind. Bat., ii. p. 975; Baker, Fl. Maurit., p. 260.

Maru.—An exceedingly common Indian plant; also ranging from China and the Philippines to Timor, but not recorded from Australia. It is naturalised in the Mauritius, and perhaps in some of the localities in Tropical Asia.

Leucas javanica, Benth.

Leucas javanica, Benth. in DC. Prodr., xii. p. 528; Miq., Fl. Ind. Bat., ii. p. 980.

Ki.—Java to Timor. *Leucas* is a large genus, generally spread over Tropical Asia and Africa. One species only, *Leucas flaccida*, which is perhaps a variety of the more widely dispersed *Leucas decemdentata*, has been found on the coast of Queensland in Australia.

Leucas decemdentata, Smith.

Leucas decemdentata, Smith; DC., Prodr. xii. p. 526; Seem., Fl. Vit., p. 192; Nadeaud, Enum. Pl. Tahiti, p. 56.

Stachys decemdentata, Forst., Ins. Austr. Prodr., p. 91.

Timor Laut.—Common in Viti and Tahiti, and recently collected in Samoa; and Milne collected it in Aneiteum in 1853. Nadeaud states that it abounds in all parts of

Tahiti, and except the very rare *Phyllostegia tahitensis*, described by him in the work cited, it was the only Tahitian Labiate known to him. We have not seen his *Phyllostegia tahitensis*, which, if correctly referred to the genus, is the only one known outside of the Sandwich Islands, where there are upwards of a dozen species.

Cymaria acuminata, Dene.

Cymaria acuminata, Dene., Herb. Timor Descr., p. 71; Miq., Fl. Ind. Bat., ii. p. 992 (cum *Cymaria molli*, Miq.)

Ki; Timor Laut.—Java and the Philippines to Timor. Two other species are described from Burma; and there is a fragment of what may be a fourth species from Ki.

INCOMPLETÆ.

NYCTAGINEÆ.

Mirabilis jalapa, Linn.

Mirabilis jalapa, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 988; Hemsl. in Godm. et Salv. Biol. Centr.-Am. Bot., iii. p. 1.

Timor Laut.—A native of the Mexican region, now naturalised in most warm countries. The genus is peculiar to America.

Boerhaavia diffusa, Linn.

Boerhaavia diffusa, Linn.; Benth., Fl. Austr., v. p. 277; Miq., Fl. Ind. Bat., i. 1, p. 992 (*Boerhaavia glutinosa*, Vahl); Seem., Fl. Vit., p. 196; Mann in Proc. Amer. Acad., vii. p. 198; Nadeaud, Enum. Pl. Tahiti, p. 46.

Arrou.—A very common perennial herb in the warm parts of Asia, Africa, and Australia, and throughout Polynesia, especially in maritime districts. *Boerhaavia repanda*, Willd., a stouter coarser plant than *Boerhaavia diffusa*, Linn., is almost equally common in similar situations. Closely allied species are common in America.

Pisonia aculeata, Linn.

Pisonia aculeata, Linn.; Benth., Fl. Austr., v. p. 279; Miq., Fl. Ind. Bat., i. 1, p. 989 (*Pisonia villosa*, Poir.); Griseb., Fl. Brit. W. Ind., p. 70.

Timor Laut; Babar.—A spiny shrub common in maritime districts, both in the warmer parts of America and in the Old World; but generally replaced by the unarmed *Pisonia inermis*, Jacq., and one or two other species in Polynesia.

There are about sixty known species of *Pisonia*, the majority of which inhabit Tropical America; a few are indigenous in Asia, the Pacific Islands, and Australia; but hitherto only *Pisonia aculeata* has been detected in Africa. One of the Australian species is also a native of New Zealand, and some parts of Polynesia.

AMARANTACEÆ.

Deeringia celosioides, R. Br.

Deeringia celosioides, R. Br.; Benth., Fl. Austr., v. p. 209; Miq., Fl. Ind. Bat. i. 1, p. 1025.

Timor Laut; Babar; Lakor; Wetter.—India, China, the Philippine and Marianne Islands, southward to Australia and New Caledonia, but apparently not extending to Polynesia proper. *Deeringia* is a small genus restricted to the warmer parts of the Old World.

Deeringia altissima, F. Muell.

Deeringia altissima, F. Muell.; Benth., Fl. Austr., v. p. 210.

Timor Laut.—Common in maritime districts and on river banks, in Northern New South Wales, and in Queensland. There are also specimens in the Kew Herbarium of what appears to be same species from New Caledonia.

Celosia argentea, Linn.

Celosia argentea, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1028; Dene., Herb. Timor. Descr., p. 44.

Arrou; Ki.—An annual herb widely dispersed in warm countries, but most likely introduced into America. It is not recorded from Australia, and we have seen no Polynesian specimens. The genus comprises about thirty species inhabiting the warmer parts of Asia, Africa, and America.

Allmania albida, R. Br.

Allmania albida, R. Br. in Wall. Cat., n. 6981.
Chamissoa albida, Moq. in DC. Prodr., xiii. 2, p. 248.

Dammar.—Southern India, Ceylon, the Philippines, and Java, are the localities represented in the Kew Herbarium; but it is apparently uncommon. *Allmania nodiflora* is a common Archipelago plant. Altogether, there are only three or four species, and they are restricted to Tropical Asia.

Amarantus spinosus, Linn.

Amarantus spinosus, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1031; Dene., Herb. Timor. Descr., p. 43; Griseb., Fl. Brit. W. Ind., p. 68.

Arrou.—This is now widely dispersed in warm regions, both in the Old World and America; but it is not included in Bentham's Flora Australiensis, and it does not appear to colonise in Polynesia. There are probably about thirty-five distinct species of *Amarantus*.

Amarantus caudatus, Linn.

Amarantus caudatus, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1030.

Timor Laut; Babar.—Widely dispersed in the warmer parts of Asia, and also occurring in Tropical Africa. It is often cultivated. *Amarantus melancholicus*, Linn., is another very widely dispersed species, and a variety of it called "*tricolor*" is common in Polynesia.

Amarantus viridis, Linn.

Amarantus viridis, Linn.; Benth., Fl. Austr., v. p. 215.
Euxolus viridis, Moq.; Miq., Fl. Ind. Bat., i. 1, p. 1035.

Arrou; Ki; Timor Laut; Moa.—An annual herb, now widely dispersed in the warmer parts of Europe, Asia, Africa, America, and Australia, growing usually in cultivated ground and waste places. It is impossible to determine where it is really indigenous.

Pupalia lappacea, Moq.

Pupalia lappacea, Moq.; Miq., Fl. Ind. Bat., i. 1, p. 1046.

Timor Laut.—Generally diffused and common in Tropical Asia and Africa, but not extending to Australia nor to Polynesia. The inflorescence is provided with glochidiate prickles, to which it probably owes its wide geographical area. There are only two other species of the genus known, one of which is common to Tropical Asia and Africa, and the other is exclusively African.

Achyranthes aspera, Linn.

Achyranthes aspera, Linn.; Benth., Fl. Austr., v. p. 246; Miq., Fl. Ind. Bat., i. 1, p. 1042; Seem. Fl. Vit., p. 199; Nadeaud, Enum. Pl. Tahiti, p. 45; Griseb., Fl. Brit. W. Ind., p. 62.

Timor Laut.—An annual herb, generally diffused in Tropical and Subtropical Asia, Africa, America, Eastern Australia, and almost throughout Polynesia. *Achyranthes* is a small genus generally spread in warm regions.

Nothosærua brachiata, Wight.

Nothosærua brachiata, Wight., Ic. Pl. Ind. Or., vi. p. 1.
Ærua brachiata, Mart.; DC., Prodr., xiii. 2, p. 304.

Timor Laut.—An annual herb widely dispersed in Tropical Asia and Africa. It is the only species of the genus.

Gomphrena globosa, Linn.

Gomphrena globosa, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 1050; Seem., Fl. Vit., p. 199; Rumph., Herb. Amb., v. t. 100, fig. 2.

Ki.—The genus *Gomphrena* comprises about seventy species, of which fourteen inhabit Australia, and the rest the warmer regions of America. *Gomphrena globosa* is probably

indigenous in America only, though it is now very widely spread in the Old World. It is an annual, and is commonly cultivated for ornament.

Gomphrena canescens, R. Br. var. ?

Gomphrena canescens, R. Br. var. ? Benth., Fl. Austr., v. p. 253.

TIMOR LAUT.—Typical *Gomphrena canescens* has only been found in the northernmost part of Australia.

CHENOPODIACEÆ.

Salsola kali, Linn. var.

Salsola kali, Linn. var.; Benth., Fl. Austr., v. p. 207.
Salsola australis, R. Br., Prodr. Fl. N. Holl., p. 411; Miq., Fl. Ind. Bat., i. 1, p. 102.
Salsola tragus, Dene., Herb. Timor. Descr., p. 42, excl. syn.

MARU.—This seaside and salt-marsh herb is very widely diffused in temperate and subtropical regions, both in America and in the Old World.

Aristolochia indica, Linn. var. ?

Aristolochia indica, Linn. var. ? Benth., Fl. Austr., vi. p. 209; Miq., Fl. Ind. Bat., i. 1, p. 1066.

TIMOR LAUT.—This species ranges from Asia to North Australia, if the form found there really belongs to *Aristolochia indica*, of which Bentham was not quite certain. The distribution of the large genus *Aristolochia* is somewhat peculiar. It is almost universal in temperate and tropical regions, yet very rare, or quite absent from some large areas. Thus no species is indigenous in Britain; and in the southern hemisphere the genus is not represented in extratropical South Africa nor in New Zealand, and only one species grows in Chili. Five species are found in Eastern Australia, but none in Western; and Duchartre, who monographed the genus for De Candolle's Prodromus, was not aware of the existence of the genus in Polynesia. Neither Seemann nor any other writer on the Flora of Polynesia includes the genus. But in 1878 Mr Horne, of the Mauritius Botanic Garden, collected fruit-bearing specimens of an *Aristolochia* in the Fiji group; and more recently the Rev. Mr Powell sent a capsule and a flower of a species gathered in Samoa. There is no record of the exact localities of these Polynesian species, nor of their relative frequency; but we may assume that they are rare or very local, otherwise earlier collectors would have met with them.

PIPERACEÆ.

Piper spp.

LARAT; TIMOR LAUT; BABAR.—Imperfect specimens of three or four species of *Piper* are in the collections from the above islands. They include what may be *Piper officinarum*, C. DC. (*Chavica officinarum*, Miq.), which is common throughout the Archipelago, though it does not extend to Australia. The genus is represented in all tropical countries.

MYRISTICEÆ.

Myristica insipida, R. Br.?

Myristica insipida, R. Br.? DC., Prodr., xiv. p. 206; Benth., Fl. Austr., v. p. 281.

Timor Laut.—This is the only Australian species of a genus so largely developed in the Archipelago and India. In De Candolle's Prodromus (xiv. p. 187) the distribution of the genus is given as follows:—"Arbores (rarius frutices) tropicæ, in Asia meridionali frequentiores, in America australi non raræ, in insulis Africæ australis rarissimæ, in continente africano adhuc incognitæ." We are now able to extend the above range considerably. Thus, at least three species inhabit Western Tropical Africa (see Hooker, Ic. Pl., xiii., pp. 48, 49, tt. 1260–1262), three or more inhabit Polynesia (Fiji, Tonga, and Samoa), and three Central America and Mexico. There are fragments of several other species in the collection from the South-eastern Moluccas.

LAURINEÆ.

Litsea (Cylicodaphne) sp.

Dammar.—This is the only laurel in the collections, which is rather surprising, because the order abounds in the Archipelago, and a considerable number inhabit Tropical Australia.

Cassytha filiformis, Linn.

Cassytha filiformis, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 977; Benth., Fl. Austr., v. p. 311; Mann in Proc. Amer. Acad., vii. p. 199; Nadeaud, Enum. Pl. Tahiti, p. 47.

Arrou; Ki.—Bentham unites *Cassytha americana*, Nees, with this, and thus enlarged, the species is very widely diffused, chiefly in maritime districts, in Tropical Asia, Africa, America, and Australia.

Hernandia peltata, Meissn.

Hernandia peltata, Meissn.; Benth., Fl. Austr., v. p. 314; Seem., Fl. Vit., p. 204, t. 52; Baker, Fl. Maurit., p. 293; Nadeaud, Enum. Pl. Tahiti, p. 48.

Hernandia sonora, Miq., Fl. Ind. Bat., i. 1, p. 887, et Forst., Fl. Ins. Austr. Prodr., p. 65, non Linn.

Larat; Timor Laut.—Common in the Archipelago, from China, Loo Choo, and the Philippines southward; also in Polynesia from the Fiji to the Society Islands, and in the Mascarene Islands. The genus *Hernandia* consists of about eight or nine arboreous species, spread over the tropics of both hemispheres, but usually growing in maritime districts. Nadeaud, *loc. cit.*, designates *Hernandia peltata* one of the "plantes madréporiques."

Hernandia, n. sp.?

Ki.—This is apparently an undescribed species of *Hernandia;* but flowers are wanting, as are the involucral bracts which enclose the fruit until it is ripe.

PROTEACEÆ.

Grevillea gibbosa, R. Br. (Plate LXV. F.)

Grevillea gibbosa, R. Br. in Trans. Linn. Soc. Lond., x. p. 177; Benth., Fl. Austr., v. p. 463.

ARROU.—This arboreous species inhabits the islands of the coast of Queensland, and Mr Moseley brought a single fruit of it from the above-named island. With the exception of a few species in New Caledonia, this genus, which comprises about 160 species, is restricted to Australia.

Grevillea sp.? (Plate LXV. G.)

ARROU.—There is a little doubt respecting the genus of this fruit. Dr Beccari writes that he has flowers of what he thinks may be the same from New Guinea.

LORANTHACEÆ.

Loranthus longiflorus, Desr.?

Loranthus longiflorus, Desr.? Benth., Fl. Austr., iii. p. 390.

KI; TIMOR LAUT.—Typical *Loranthus longiflorus* is found in India, Timor, and North-eastern Australia. Imperfect specimens of three or four other species were collected in the Eastern Moluccas. The genus *Loranthus* numbers nearly 350 species spread all over the tropics, and a few extending into temperate regions, as one in Europe, four or five in New Zealand, and ten or a dozen in Chili.

SANTALACEÆ.

Exocarpus latifolia, R. Br. var.?

Exocarpus latifolia, R. Br. var.? Benth., Fl. Austr., vi. p. 228; Miq., Fl. Ind. Bat., i. 1, p. 781.

TIMOR LAUT.—This species ranges from the Philippines to North-eastern Australia, southward to the Tweed river and New South Wales. It includes the *Exocarpus miniata*, Zipp., *Exocarpus luzonensis*, Presl, and *Exocarpus ovata*, Schnitzl. The genus comprises about fourteen species, whereof nine, including the present, inhabit Australia, and eight of these are endemic and spread over the whole country. There is one endemic species in New Zealand, one in Norfolk Island, one in New Caledonia, one in the Sandwich Islands, and one in Madagascar. The apparent absence of the genus from the other parts of Polynesia is remarkable.

EUPHORBIACEÆ.

Euphorbia atoto, Forst.

Euphorbia atoto, Forst., Fl. Ins. Austr. Prodr., p. 36; Benth., Fl. Austr., vi. p. 46; Seem., Fl. Vit., p. 216; Nadeaud, Enum. Pl. Tahiti, p. 72.

ARROU; KI; TIMOR LAUT.—A seaside shrubby species inhabiting the coast of India, the

Archipelago, North Australia, and Polynesia, from New Caledonia to the Fiji, Friendly, and Society Islands. Seemann also records it from the Sandwich Islands, collected by Macrae, Nuttall, and Barclay; but we have seen no specimens thence, and it is not included in H. Mann's enumeration of Sandwich Island plants; probably the specimens referred hither by Seemann belong to the allied *Euphorbia cordata*. The genus *Euphorbia* comprises between 600 and 700 species, growing in the most diverse localities, throughout the temperate and tropical regions, and exhibiting, perhaps, a greater variety in habit and duration than is to be found in any other genus. *Euphorbia atoto* belongs to a section of shrubby species mostly inhabiting the sea-coast and especially oceanic islands. *Euphorbia buxifolia*, of the Bermudas and West Indies, and *Euphorbia origanoides*, of Ascension, belong to the same group, which is also largely represented in Polynesia. Thus *Euphorbia chamissonis* is found in the Marshall Islands, and *Euphorbia ramosissima*, in Pitcairn and Elizabeth Islands. Another, though closely allied section, is peculiar to the Galapagos and the West Indies, eight species being endemic in the former group, and one in the Bahamas. Bentham, *loc. cit.*, reduces *Euphorbia levis*, Poir. (*Euphorbia lævigata*, Vahl) to *Euphorbia atoto*. See also Miquel, Fl. Ind. Bat., i. 2, p. 419. Nadeaud, *loc. cit.*, states that *Euphorbia atoto* especially affects the coralline parts of the shores of Tahiti.

Euphorbia antiquorum, Linn.

Euphorbia antiquorum, Linn.; Boiss. in DC. Prodr., xv. 2, p. 81; Miq., Fl. Ind. Bat., i. 2, p. 418.

Timor Laut.—A shrubby species, armed with spines, and usually almost leafless, and having thick, fleshy, angular branches, resembling some Cactaceæ. A sea-shore species, ranging from India to Timor.

Euphorbia pilulifera, Linn.

Euphorbia pilulifera, Linn.; Miq., Fl. Ind. Bat., i. 2, p 420; Benth., Fl. Austr., vi. p. 51; Seem., Fl. Vit., p. 216; Mann in Proc. Amer. Acad., vii. p. 204.

Arrou; Ki.—An annual species, now generally diffused in warm regions of both hemispheres.

Phyllanthus reticulatus, Poir.

Phyllanthus reticulatus, Poir.; Müll. Arg. in DC. Prodr., xv. 2, p. 344 (*varietates*); Benth., Fl. Austr., vi. p. 101.

Anisonema eglandulosum, Dene., Herb. Timor. Descr., p. 154; Miq., Fl. Ind. Bat., i. 2, p. 375.

Babar; Wetter.—As circumscribed by Müller, *loc. cit.*, this is widely spread in Tropical Asia and Africa. It is also found in the West Indies (*Phyllanthus jamaicensis*, Griseb., Fl. Brit. W. Ind., p. 34), where, however, it is probably a colonist. The Australian locality is doubtful.

Phyllanthus niruri, Linn.

Phyllanthus niruri, Linn.; Miq., Fl. Ind. Bat., i. 2, p. 369; Mann in Proc. Amer. Acad., vii. p. 203; Rumph., Herb. Amb., vi. t. 17.

TIMOR LAUT.—Very widely dispersed in warm countries, though not recorded from Australia, nor included in Seemann's Flora Vitiensis. It is an annual, and its present wide area is doubtless partly due to conveyance with the seeds of cultivated plants.

Phyllanthus diversifolius, Miq. var. ?

Phyllanthus diversifolius, Miq. var.? Miq., Fl. Ind. Bat. Suppl., i. p. 448; Müll. Arg. in DC. Prodr., xv. 2, p. 297.

TIMOR LAUT.—India and throughout the Archipelago. Fragments of several other species of this genus are before us from Arrou, Timor Laut, and other islands. Altogether there are upwards of 400 species, which are very widely dispersed in warm and temperate regions, excluding Europe and Asiatic Russia, and some other parts; and relatively rare in all temperate regions. In Polynesia, according to Seemann, *loc. cit.*, one-third of all the Euphorbiaceæ known in his time belonged to *Phyllanthus*, and he enumerates no fewer than twenty-seven from New Caledonia.

Securinega sp. ?

TIMOR LAUT.—*Securinega* is a genus of about eight shrubby species, widely scattered in Tropical Asia, Africa, and Australia.

Breynia fruticosa, Benth. et Hook. f.

Breynia fruticosa, Benth. et Hook. f., Gen. Plant., iii. p. 277.
Melanthesopsis fruticosa, Müll. Arg. in DC. Prodr., xv. 2, p. 437.

TIMOR LAUT.—China to Borneo, according to Müller. This genus comprises about a dozen species spread over Tropical Asia, Australia, and the South Pacific Islands.

Jatropha curcas, Linn.

Jatropha curcas, Linn.; DC., Prodr., xv. 2, p. 1080; Miq., Fl. Ind. Bat., i. 2, p. 392; Dene., Herb. Timor. Descr., p. 159; Griseb., Fl. Brit. W. Ind., p. 36; Seem., Fl. Vit., p. 230.

MARU.—A native of Tropical America commonly cultivated in other warm countries, and now widely naturalised. Miquel states that it is universally planted in Java, up to an elevation of 5000 feet; he also mentions that it was planted in Timor. Seemann records it from the Tongan Islands, and adds, that it had been introduced thence into the Fiji Islands. It is the "Physic-nut plant," and is commonly cultivated for the sake of the purgative oil afforded by its seeds. *Jatropha* numbers nearly seventy species, spread over the warmer regions of the earth, but by far most numerous in America.

Aleurites moluccana, Willd.

Aleurites moluccana, Willd.; Müll. Arg. in DC. Prodr., xv. 2, p. 723; Benth., Fl. Austr., vi. p. 128; Seem., Fl. Vit., p. 223; Nadeaud, Enum. Pl. Tahiti, p. 73; Mann in Proc. Amer. Acad., vii. p. 203.

Aleurites triloba, Forst., Char. Gen. Pl., p. 112, t. 56; Miq., Fl. Ind. Bat., i. 2, p. 385; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 118, 128, 138, et 148.

ARROU.—A tree generally spread in Polynesia, and occurring in North-eastern Australia, as well as some of the Moluccas; and it is now naturalised in most other tropical countries. It is one of the most abundant trees in some of the islands of Polynesia, yielding an oil and other products in common use. Nadeaud states that in Tahiti it is widely spread, growing from the sea-shore to an altitude of upwards of 3000 feet. There are only two other species of the genus, and they inhabit the same region.

Codiæum variegatum, Blume var.

Codiæum variegatum, Blume var.; Müll. Arg. in DC. Prodr., xv. 2, p. 1119 (*varietates*); Seem., Fl. Vit., p. 231; Benth., Fl. Austr., vi. p. 147.

Codiæum moluccanum, Dene., Herb. Timor. Descr., p. 157; Miq., Fl. Ind. Bat., i. 2, p. 383.

ARROU; KI.—The genus *Codiæum*, as circumscribed by Bentham and Hooker (Gen. Plant., iii. p. 300), comprises four species, which inhabit the Malayan Archipelago, Polynesia, and Australia. The present species is widely spread in India, the Archipelago, and Polynesia, where there are many varieties having variegated foliage, commonly cultivated for ornamental purposes. Seemann states that a great many varieties and subvarieties of this species are cultivated by the natives in the Fiji Islands, and they all have distinguishing names. There are specimens in the Kew Herbarium from the Isle of Pines, near New Caledonia, from Tanna, New Hebrides, from Pig Island in the Louisiade group, from the Admiralty, and from Samoa; but it is not included in Nadeaud's Enumeration of Tahitian Plants. Müller cites the following plates in Rumphius' Herb. Amb. as varieties of this plant: vol. i., tt. 25–27.

Manihot utilissima, Pohl.

Manihot utilissima, Pohl.; DC., Prodr., xv. 2, p. 1064.

TIMOR LAUT.—A tropical American plant, extensively cultivated in many warm countries for its edible root. Another species, *Manihot palmata*, Müll. Arg., of the same origin, is also cultivated for the same purpose, and had already been introduced by settlers in Fiji when Seemann visited the islands (see Fl. Vit., p. 229). *Manihot* is a genus of about eighty described species, all of them American, and the majority Brazilian.

Claoxylon rubescens, Miq.?

Claoxylon rubescens, Miq.? Fl. Ind. Bat., i. 2, p. 387.

ARROU.—This species was founded upon Javanese specimens. The genus, which consists

of upwards of forty species, is spread over Tropical Asia and Africa, and there are three or four apparently endemic species in North-eastern Australia. An imperfect specimen of what may be a second specimen of this genus was collected in Arrou.

Acalypha grandis, Benth.

Acalypha grandis, Benth. in Hook. Lond. Journ. Bot., 1843, p. 232; Seem., Fl. Vit., p. 224; Müll. Arg. in DC. Prodr., xv. 2, p. 806.

Ki.—This tree seems to be common in the Archipelago and Polynesia, but it does not extend to Australia. There are specimens in the Kew Herbarium from the Philippines, the Gilbert, Ellice, Fiji, and Navigator's groups; also from the Admiralty Islands and New Hebrides. *Acalypha* is a genus of upwards of 200 species, generally dispersed in warm countries.

Acalypha pancheriana, Baill. ?

Acalypha pancheriana, Baill. ? Adansonia, ii. p. 225; DC., Prodr., xv. 2, p. 808.

Ki.—It is very doubtful whether this is the same as the original New Caledonian plant. Whatever it may be, the same species was also collected by Mr Moseley in Api, New Hebrides.

Acalypha indica, Linn.

Acalypha indica, Linn., Herb. Timor. Descr., p. 160; Miq., Fl. Ind. Bat., i. 2, p. 404; Müll. Arg. in DC. Prodr., xv. 2, p. 868.

Arrou; Timor Laut; Moa.—An annual, common in India, China, and the Loo Choo Islands, southward to Timor, but not known to extend to Australia or Polynesia. It is also in Tropical Africa, the Mauritius, and the Seychelles.

Mallotus ricinoides, Müll. Arg.

Mallotus ricinoides, Müll. Arg. in DC. Prodr., xv. 2, p. 963; Benth., Fl. Austr., vi. p. 139.
Rottlera zippelii, Hassk., et *Rottlera peltata*, Miq., excl. syn. in Fl. Ind. Bat., i. 2, pp. 394 et 395.

Ki.—A tree ranging from the Philippines and China to the Moluccas and North-eastern Australia. As now usually circumscribed, *Mallotus* consists of about seventy species, spread over the warmer regions of the Old World, but least numerous in Africa.

Mallotus philippinensis, Müll. Arg.

Mallotus philippinensis, Müll. Arg. in DC. Prodr., xv. 2, p. 980; Benth., Fl. Austr., vi. p. 141.
Rottlera tinctoria, Roxb., Pl. Corom., ii. p. 36, t. 168.

Letti.—A common tree throughout Tropical India and China, southward to Australia, but apparently not in Polynesia, where it is replaced by *Mallotus tiliæfolius*.

Mallotus muricatus, Müll. Arg. ?

Mallotus muricatus, Müll. Arg. in DC. Prodr., xv. 2, p. 972?

TIMOR LAUT; BABAR.—The true plant is found in Ceylon, Java, Philippines, and Timor.

Mallotus albus, Müll. Arg.

Mallotus albus, Müll. Arg. in DC. Prodr., xv. 2, p. 965.
Rottlera alba, Roxb., Fl. Ind., iii. p. 826; Miq., Fl. Ind. Bat. Suppl., p. 453.

TIMOR LAUT.—Widely spread in India, and extending to Sumatra and Java.

Mallotus moluccanus, Müll. Arg.

Mallotus moluccanus, Müll. Arg. in DC. Prodr., xv. 2, p. 958.
Rottlera multiglandulosa, Blume; Dene., Herb. Timor. Descr., p. 158.
Melanolepis multiglandulosa, Reichb. f. et Zoll.; Miq., Fl. Ind. Bat., i. 2, p. 399.

TIMOR LAUT; DAMMAR.—From the Philippines and the Marianne Islands to Timor.

Mallotus repandus, Müll. Arg.

Mallotus repandus, Müll. Arg. in DC. Prodr., xv. 2, p. 981; Benth., Fl. Austr., vi. p. 142.
Rottlera scabrifolia, Adr. Juss.; Dene., Herb. Timor. Descr., p. 157.

TIMOR LAUT.—India, China, and the Philippines, to North-eastern Australia and New Caledonia.

Macaranga tanarius, Müll. Arg.

Macaranga tanarius, Müll. Arg. in DC. Prodr., xv. 2, p. 997; Benth., Fl. Austr., vi. p. 146.

ARROU; TIMOR LAUT.—A shrub ranging from India, South China, and the Philippines, southward to Eastern Tropical Australia and the New Hebrides. *Macaranga* comprises about eighty species, spread all over the tropical regions of the Old World.

Macaranga involucrata, Baill. var. ?

Macaranga involucrata, Baill. var. ? Etud. Euphorb., p. 432; Müll. Arg. in DC. Prodr., xv. 2, p. 1011; Benth., Fl. Austr., vi. p. 146.

ARROU; KI; TIMOR LAUT.—Amboina, and other islands of the Archipelago, and Queensland in North-eastern Australia. There are also fragments of three or four other species of this genus from Ki and Timor Laut.

Ricinus communis, Linn.

Ricinus communis, Linn.; Müll. Arg. in DC. Prodr., xv. 2, p. 1017; Seem., Fl. Vit., p. 229; Miq., Fl. Ind. Bat., i. 2, p. 390–391 (species 1–6); Mann in Proc. Amer. Acad., vii. p. 203; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 120 et 147; Rumph., Herb. Amb., iv. p. 90.

ARROU.—The castor-oil plant is now very generally spread in tropical and subtropical regions, and it is uncertain where it is really indigenous; but Africa is regarded as its

original home. It is not a common plant in oceanic islands, though it is one of the few collected in South Trinidad by Dr Copeland. Seemann states that he found it far in the interior of Viti Levu, but he adds that it is in none of the older Polynesian collections, nor is it alluded to by the older botanists as existing in any part of Tropical Polynesia. Jouan, *loc. cit.*, states that Dr F. D. Bennett signalised the existence of a species of *Ricinus* in the Marquesas Islands, where the natives called it "Toï," and that the same was very common in the Sandwich Islands. Nadeaud does not include *Ricinus* in his Enumeration of Tahitian plants, nor is it given in Bentham's Flora Australiensis; but Bennett (Gatherings of a Naturalist in New South Wales, p. 332) mentions that it grew commonly in New South Wales, propagated by self-sown seeds, or conveyed by birds.

Gelonium bifarium, Dene.

Gelonium bifarium, Dene., Herb. Timor. Descr., p. 156.
Gelonium glomerulatum, Hassk.; Müll. Arg. in DC. Prodr., xv. 2, p. 1128.
Gelonium obtusum, Miq., Fl. Ind. Bat. Suppl., p. 452.

TIMOR LAUT.—Philippines, Sumatra, and Java, to Timor. A small genus, restricted to the warmer parts of Asia and Africa.

Carumbium populifolium, Reinw.

Carumbium populifolium, Reinw.; Miq., Fl. Ind. Bat., i. 2, p. 414; Benth., Fl. Austr., vi. p. 150.
Carumbium populneum, *Carumbium sieberi*, et *Carumbium platyneuron*, Müll. Arg. in DC. Prodr., xv. 2, pp. 1144 et 1145, fide Benth.

ARROU.—A shrub or small tree, ranging from the Philippines and Java to Eastern Australia, southward to Victoria, and to some of the Pacific Islands.

Excæcaria agallocha, Linn.

Excæcaria agallocha, Linn.; Benth., Fl. Austr., vi. p. 152; Miq., Fl. Ind. Bat., i. 2, p. 415; Seem., Fl. Vit., p. 232.

TIMOR LAUT.—An essentially littoral tree, often growing in the tidal forests. It inhabits the coasts of Tropical India, the Archipelago, and North-eastern Australia; also New Caledonia, the Fiji and Friendly Islands.

URTICACEÆ.

Celtis paniculata, Planch.

Celtis paniculata, Planch.; DC., Prodr., xvii. p. 182; Benth., Fl. Austr., vi. p. 156; Seem., Fl. Vit., p. 234.
Solenostigma paniculatum, Endl., Prodr. Fl. Norf., p. 42.

TIMOR LAUT.—Eastern Australia, from the Gulf of Carpentaria to Kiama, in New South Wales; also in Norfolk Island. The genus *Celtis* is diffused all round the northern

hemisphere, and extends into the southern in America, Africa, and Australia. Finally, *Celtis pacifica*, Planch., inhabits the Tongan and Marquesas Islands.

Trema timorensis, Hemsl.

Sponia timorensis, Dcne., Herb., Timor. Descr., p. 170; DC., Prodr., xvii. p. 196; Miq., Fl. Ind. Bat., i. 2, p. 216.

TIMOR LAUT.—Also in Timor. *Trema* is wanting in the north temperate zone, but in the tropics and in southern subtropical regions it is as widely spread as *Celtis* is in the northern. Two species occur in Polynesia.

Trema angustifolia, Lindl.

Trema angustifolia, Lindl. in Wall. Cat., n. 3691.
Sponia angustifolia, Planch. in DC. Prodr., xvii. p. 202.

BABAR.—South China and Malayan Peninsula, but not recorded before from the Archipelago.

Fatoua pilosa, Gaud.

Fatoua pilosa, Gaud., Voy. Bonite, t. 84; Bureau in Ann. Sci. Nat. ser. 5, xi. p. 375; Benth., Fl. Austr., vi. p. 182.
Fatoua lanceolata, Dcne., Nouv. Ann. Mus. Par. iii. p. 492; Miq., Fl. Ind. Bat., i. 2, p. 282.

KI; TIMOR LAUT; LAKOR.—Apparently an annual herb, although the stem becomes woody below; ranging from China, Japan, and the Philippines, through the Archipelago to North Australia; also in New Caledonia, and there is a specimen in the Kew Herbarium labelled "Assam," without a collector's name. Bentham, *loc. cit.*, states further that it is dispersed over the South Sea Islands, but this is apparently a slip of the pen, for there are no specimens from that region in the Kew Herbarium, and we find no other record of its existence, either in Seemann's Flora Vitiensis, or elsewhere.

Ficus pilosa, Reinw.

Ficus pilosa, Reinw.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 260; Benth., Fl. Austr., vi. p. 164.
Urostigma pilosum, Miq., Fl. Ind. Bat., i. 2, p. 351.

TIMOR LAUT.—This species has been collected in Sumatra, Java, Borneo, Banca, Timor, New Guinea, and Queensland in Australia. The genus *Ficus* is one of the largest genera in the vegetable kingdom, upwards of 600 species being represented in the Kew Herbarium; and, judging from the proportion of new ones in recent collections from various parts of the world, the total number in existence must be much greater. By far the greatest concentration of species is in Tropical Asia, including the Archipelago, and it is in Asia only—in China and Japan—where the genus is strongly represented in

quite temperate regions. One species, the common one, occurs in the Mediterranean region; two or three inhabit South Africa; but in Chili there is none. Indeed, the genus scarcely extends south of the tropics in South America, and in North America the northern limit is in South Florida, where three species have been gathered. There is also a considerable number of species in Polynesia, but they mostly inhabit the groups of islands nearest to the Indian Archipelago, only two species, *Ficus tinctoria* and *Ficus prolixa*, reaching the Society Islands, and none apparently the Marquesas. Nor is the genus represented by any indigenous species in the Sandwich Islands or Galapagos; yet a very interesting collection of plants from some of the most remote of the Pacific Islands, presented to the Kew Herbarium in 1882 by J. S. Arundel, Esq., contains a specimen of a species of *Ficus* from Fanning, a small island in the North Pacific in about the same longitude as the centre of the Sandwich Islands, but only about 4° 50′ north of the equator. The specimens are merely barren shoots, but there is no doubt about the genus; and it is noted that they were taken from a tree which "grows about 100 feet high, and resembles a banyan." Finally, there are between thirty and forty species, known from Australia chiefly from within the tropics, and none extending to Victoria, South or West Australia. In addition to those enumerated below, there are at least half a dozen undetermined species in the collections from the South-eastern Moluccas.

Ficus retusa, Linn.

Ficus retusa, Linn., Benth., Fl. Austr., vi. p. 166; Miq. in Ann. Mus. Lugd. Bat., iii. p. 267.
Urostigma retusum, Miq., et *Urostigma nitidum*, Miq., Fl. Ind. Bat., i. 2, p. 345.

Arrou; Ki; Moa.—A very common species, ranging from India, South China, and the Philippines, to New Guinea and North-eastern Australia.

Ficus benjamina, Linn.

Ficus benjamina, Linn., Mant., p. 129; Benth., Fl. Austr., vi. p. 167.
Urostigma benjaminum, Miq., Fl. Ind. Bat., i. 2, p. 346.
Ficus neglecta, Dene., Herb. Timor. Descr., p. 166.

Ki; Timor Laut.—Widely dispersed in India and throughout the Archipelago, where, however, it was often planted, according to Miquel. It has also been found in Rockingham Bay, on the coast of Queensland, Australia.

Ficus quercifolia, Roxb.

Ficus quercifolia, Roxb., Fl. Ind., iii. p. 534; Miq., Fl. Ind. Bat., i. 2, p. 297.

Arrou.—This species was founded upon specimens cultivated in the Calcutta Botanic Garden, and obtained from Bencoolen in Sumatra. It has since been collected in Moulmein, by T. Lobb; and Miquel doubtfully records it from Java.

Ficus ampelas, Burm.

Ficus ampelas, Burm.; Miq., Fl. Ind. Bat., i. 2, p. 303, et in Ann. Mus. Bot. Lugd. Bat., iii. p. 272.
Ficus rubricaulis, Dene., Herb. Timor Descr., p. 168.

Timor Laut.—Also in Java, the Celebes, and Timor.

Ficus rostrata, Lam.

Ficus rostrata, Lam.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 274, et Fl. Ind. Bat., i. 2, p. 307.

Ki.—Generally dispersed in the Archipelago, extending to Sumatra and the Philippines. It is very variable in foliage, and includes the forms at first described by Miquel as species under the names *Ficus lobbii*, *Ficus raridens*, *Ficus obtusidens*, and *Ficus angulidens*.

Ficus decaisneana, Miq.

Ficus decaisneana, Miq., Fl. Ind. Bat., i. 2, p. 312.
Ficus firmula, Miq., et *Ficus trematocarpa*, Miq. in Ann. Mus. Bot. Lugd. Bat., i. 2, p. 224.

Ki; Timor Laut; Lakor.—Also in Ceram, Buru, Amboina, and Timor.

Ficus fistulosa, Reinw.

Ficus fistulosa, Reinw.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 284.

Dammar.—A very distinct species, of which we have seen specimens from the Khasya Mountains in India, from Java, and from Borneo.

Ficus ribes, Reinw.

Ficus ribes, Reinw.; Miq. in Ann. Mus. Bot. Lugd. Bat., iii. p. 284.
Covellia ribes, Miq., Fl. Ind. Bat., i. 2, p. 325.
Covellia paniculata, Miq., et *Covellia microcarpa*, Miq. in Hook. Lond. Journ. Bot., vii. (1848), pp. 466 et 467.

Arrou.—Philippines and Sumatra, through the Archipelago.

Ficus magnifolia, F. Muell.

Ficus magnifolia, F. Muell.; Benth., Fl. Austr., vi. p. 171.

Arrou; Dammar.—The only other specimens we have seen are from Mount Elliott and Rockingham Bay, Queensland, Australia.

Ficus pumila, Linn.

Ficus pumila, Linn.; Miq. in Ann. Mus. Bot. Lugd. Bot., iii. p. 294; Maximowicz in Mélanges Biologiques, Diag. Pl. Nov. Asiat., iv. p. 342.
Ficus stipulata, Thunb., *fide* Miqueli.

Arrou.—The specimen is a barren form, and may possibly belong to a different species. *Ficus pumila* is common in Japan, and also occurs in China.

Fleurya interrupta, Gaud.

Fleurya interrupta, Gaud.; Miq., Fl. Ind. Bat., i. 2, p. 228; Seem., Fl. Vit., p. 237; Nadeaud, Enum. Pl. Tahiti, p. 41; Mann in Proc. Amer. Acad., vii. p. 200; F. Muell., Syst. Census Austr. Pl., p. 22.

KI; TIMOR LAUT.—An exceedingly common herb throughout the Archipelago and Polynesia; also in India, Eastern Africa, and North-eastern Australia.

Laportea crenulata, Gaud.

Laportea crenulata, Gaud.; Miq., Fl. Ind. Bat., i. 2, p. 231.

ARROU; TIMOR LAUT.—An arboreous plant generally diffused in Tropical Asia, but not in Polynesia nor in Australia, where it is replaced by other species. *Laportea* numbers between twenty and thirty species spread over the warmer regions of the Old World; a few inhabiting Mexico and extratropical North America.

Procris pedunculata, Wedd. var.

Procris pedunculata, Wedd. var.; DC., Prodr., xvi. 1, p. 191; Nadeaud, Enum. Pl. Tahiti, p. 44; Baker, Fl. Maurit., p. 276.
Procris cephalida, Comm.; Seem., Fl. Vit., p. 241.
Procris lucida, Spreng., Syst. Veg., iii. p. 846.
Elatostema pedunculatum, Forst., Char. Gen. Plant., p. 106, t. 53.
Dorstenia lucida, Forst., Prodr. Fl. Ins. Austr., p. 11.

ARROU.—Philippines, Java, and Timor, and common throughout Eastern Polynesia, and as far in Western Polynesia as the Society Islands; also found in the Mauritius, Seychelles, Madagascar, and the Comoro Islands. There are about half-a-dozen species of *Procris*, restricted to Tropical Asia, including Polynesia, Africa, and the Norfolk Island. *Procris montana*, Steud., has recently been discovered in Australia.

Bœhmeria sp.

KI.—This is perhaps *Bœhmeria nivea*, Hook. et Arn., which is widely spread, both cultivated and wild, in Tropical Asia. The genus is a considerable one, generally spread in Tropical Asia and America, and extending into North America, and southward to Chili, and in Eastern Asia as far north as Japan. There are several species in Polynesia, but the genus is not recorded from Australia.

Pouzolzia pentandra, Benn.

Pouzolzia pentandra, Benn., Pl. Jav. Rar., p. 66, t. 14.
Memorialis pentandra, Wedd. in DC. Prodr., xvi. 1, p. 235.
Hyrtanandra pentandra et *Hyrtanandra javanica*, Miq., Fl. Ind. Bat., i. 2, p. 261.

TIMOR LAUT.—Throughout India and the Archipelago, but not found either in Polynesia or Australia. The genus comprises about fifty species, spread nearly all over the warmer regions, but less numerous in America than in the Old World.

Pipturus argenteus, Wedd.

Pipturus argenteus, Wedd.; Benth., Fl. Austr., vi. p. 185; Nadeaud, Enum. Pl. Tahiti, p. 45.
Pipturus propinquus, Wedd.; Seem., Fl. Vit., p. 244; Miq., Fl. Ind. Bat., i. 2, p. 268.

Arrou; Timor Laut.—A tree ranging from Java and the Marianne Islands to North-eastern Australia, Fiji Islands, and the New Hebrides. The allied *Pipturus velutinus* has a similar distribution in the Archipelago, but does not reach Australia, or at least, we have seen no specimens thence. In Polynesia, on the other hand, it has a much wider range, extending from the New Hebrides to the Ellice and Marquesas groups. The genus is also represented in the Mascarene and Comoro Islands, and in New Zealand.

Pipturus velutinus, Wedd.

Pipturus velutinus, Wedd.; Seem., Fl. Vit., p. 243; Miq., Fl. Ind. Bat., i. 2, p. 268.

Timor Laut.—Generally dispersed in the Archipelago and Polynesia. See the remarks under *Pipturus argenteus*.

Leucosyke capitellata, Wedd.

Leucosyke capitellata, Wedd. in DC. Prodr., xvi. 1, p. 235 [27] (*varietates plures*).
Leucosyke alba, Zoll. et Mor., *Leucosyke bimensis*, Zoll. et Mor., *Leucosyke mutabilis*, Miq., *Leucosyke villosa*, Miq., *Leucosyke elongata*, Miq., *Leucosyke falcata*, Miq. et *Leucosyke celtidifolia*, Miq. in Fl. Ind. Bat., i. 2, pp. 265, 266.

Arrou; Dammar.—A shrub or small tree spread all over the Archipelago, but not reaching either India or Australia. There are, however, specimens in the Kew Herbarium from New Ireland. The genus consists of about eight species, restricted to the Archipelago and Polynesia.

CASUARINEÆ.

Casuarina equisetifolia, Forst.

Casuarina equisetifolia, Forst., Char. Gen. Pl., p. 103, t. 52; Benth., Fl. Austr., vi. p. 197; Miq., Fl. Ind. Bat., i. 1, p. 874; Seem., Fl. Vit., p. 263; Nadeaud, Enum. Pl. Tahiti, p. 42; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 123, 138, et 147.

Arrou; Ki; Timor Laut; Dammar.—This tree is generally spread in the coast region of Tropical Asia, Africa, Australia, and Polynesia, forming in many places a conspicuous feature in the scenery. It is also naturalised in Tropical America. In Polynesia this is, or was, one of the sacred trees, which was commonly planted in burial places. Ordinarily it grows in the most barren places, unassociated with other trees. It does not extend to the Sandwich Islands. *Casuarina*, the only genus of the order, comprises about twenty-five species, of which nineteen are endemic in Australia, about four inhabit the Archipelago, and as many New Caledonia, while one more, *Casuarina nodiflora*, extends as far into Polynesia as the Fiji Islands. The genus is not represented in New Zealand; yet three or four species are common in Tasmania. The Australian species are spread all over the country.

MONOCOTYLEDONES.

HYDROCHARIDEÆ.

Enhalus acoroides, Rich.

Enhalus acoroides, Rich. in Mém. Inst. Par., 1811, ii. p. 64; Griff., Ic. Pl. Asiat., tt. 149 et 150.
Enhalus kœnigii, Rich.; Miq., Fl. Ind. Bat., iii. p. 237.

ARROU.—A submerged marine plant found on the coasts of Tropical Asia and Madagascar, and also collected by Mr Moseley at Cape York, North Australia. The only species of the genus.

Halophila ovalis, Hook. f.

Halophila ovalis, Hk. f., Fl. Tasm., ii. p. 45; Benth., Fl. Austr., vii. p. 182.

ARROU.—A marine plant, common on the shores of the Indian and Pacific Oceans; also occurring in the Red Sea. It grows both in the mud that is exposed at low water, and in water several fathoms in depth. There are two other species of the genus, both of which inhabit some part of the area of *Halophila ovalis*.

ORCHIDEÆ.

Dendrobium phalænopsis, Fitzgerald?

Dendrobium phalænopsis, Fitzgerald in Gard. Chron., N. S., xiv. p. 38, et Austr. Orch. i.?

TIMOR LAUT.—It is a little doubtful whether this is exactly the same as Fitzgerald's plant, which was discovered in Northern Queensland. A fragment of another species of *Dendrobium* is among the plants from Arrou. *Dendrobium* numbers at least 300 described species, the majority of which are concentrated in Tropical Asia, though the genus ranges from China and Japan to New Zealand and the Marquesas Islands.

Phreatia sp.

ARROU.—The specimen is insufficient for satisfactory determination of the species, though there is no doubt concerning the genus. *Phreatia* is a genus of about ten species inhabiting India, the Archipelago, and Polynesia, and one species occurs in North-eastern Australia.

Calanthe sp.

WETTER.—This genus numbers about forty species, mostly inhabiting Tropical Asia, but a few occur in Tropical Africa, America, and Polynesia; and *Calanthe veratrifolia*, a common Asiatic species, is found in Queensland and New South Wales.

Phalænopsis amabilis, Blume.

Phalænopsis amabilis, Blume; Miq., Fl. Ind. Bat., iii. p. 690.

TIMOR LAUT.—Java and the Philippines, to Buru. The genus is restricted to the Archipelago and the eastern provinces of India.

Vanda lissochiloides, Lindl.

Vanda lissochiloides, Lindl.; Miq., Fl. Ind. Bat., iii. p. 680.

ARROU.—Philippines and other islands of the Archipelago. The genus is restricted to Tropical Asia, with the exception of *Vanda hindsii*, which reaches Northern Australia. There were scraps of several other indeterminable orchids in the collections.

SCITAMINEÆ.

Curcuma sp. ?

KI.—This genus numbers between thirty and forty species, mostly inhabiting Tropical Asia. One has been discovered in Queensland; and the Turmeric (*Curcuma longa*) is widely dispersed in Polynesia, from the Fiji to Tahiti and Easter Island, but as it is commonly cultivated, it is impossible to say where it is really indigenous. Nadeaud states that it is abundant in all the valleys in Tahiti.

Riedelia curviflora, Oliv.

Riedelia curviflora, Oliv. in Hook. Ic. Pl., t. 1419, et Benth. et Hook. f., Gen. Plant., iii. p. 1226.

ARROU.—Also in Buru. As far as at present known, this genus is monotypic, and was founded upon specimens from the islands named.

Clinogyne grandis, Benth. et Hook. f.

Clinogyne grandis, Benth. et Hook. f., Gen. Pl., iii. p. 651.
Maranta grandis, Miq., Fl. Ind. Bat. Suppl., p. 616.

ARROU.—Philippines, Sumatra, Borneo, and the Admiralty Islands; and the same or a closely allied species occurs in Tropical Africa. A small genus restricted to Tropical Asia and Africa.

Musa paradisiaca, Linn.

Musa paradisiaca, Linn.; Seem., Fl. Vit., p. 290.

ARROU ?—Wallace[1] includes the plantain among the articles of food of the Aruese; but he does not state whether it grows in the island.

[1] Malay Archipelago, ii. p. 229.

AMARYLLIDEÆ.

Eurycles amboinensis, Loud.

Eurycles amboinensis, Loud.; Benth., Fl. Austr., vi. p. 456; Miq., Fl. Ind. Bat., iii. p. 582.
Pancratium amboinense, Linn.; Bot. Mag., t. 1419.

Ki.—A bulbous plant ranging from the Philippines and Java to Amboina, and the islands of the coast of Queensland. The only other species of *Eurycles* is endemic in North-eastern Australia.

Crinum pedunculatum, R. Br.

Crinum pedunculatum, R. Br.; Benth., Fl. Austr., vi. p. 455.

Timor Laut.—This has a wide area in Australia, ranging from Moreton Bay to the Murray river in South Australia. *Crinum* numbers some sixty species generally diffused in the tropics, and extending into some extratropical regions.

Crinum asiaticum, Linn. vars.

Crinum asiaticum, Linn. vars.; Benth., Fl. Austr., vi. p. 454; Miq., Fl. Ind. Bat., iii. p. 580; Seem., Fl. Vit., p. 305.

Arrou; Timor Laut.—A bulbous plant of the sandy sea-coast of Tropical Asia and North-eastern Australia; also in the Fiji Islands.

TACCACEÆ.

Tacca pinnatifida, Forst.

Tacca pinnatifida, Forst.; Benth., Fl. Austr., vi. p. 458; Miq., Fl. Ind. Bat., iii. p. 577; Rumph., Herb. Amb., v. p. 328, t. 114; Seem., Fl. Vit., p. 102; Nadeaud, Enum. Pl. Tahiti, p. 35; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 130 et 145; Mann in Proc. Amer. Acad., vii. p. 205.

Arrou.—This herbaceous plant is now generally diffused in maritime districts of Tropical Asia and Africa, and throughout Polynesia, as well as on the coast of North-eastern Australia, but is commonly cultivated for its tuberous roots in Polynesia and in some other parts of its area. It is probably not indigenous in Polynesia, at least in those islands nearest to America. Jouan states that it is rare in the Marquesas Islands, only a few plants being found here and there in shady, humid ravines, and the plant as well as the Tahitian name "Pia" he regards as of comparatively recent introduction into Nukuhiva. Nadeaud mentions that it is often cultivated near houses in Tahiti, and also that it abounds in a wild state in many of the valleys. Mann treats it as indigenous in the Sandwich Islands, where, according to Seemann, it grows spontaneously in sunny places, and is also cultivated to a considerable extent. It bears the same name, "Pia," in the Sandwich Islands, and indeed throughout Polynesia. Altogether there are nine species of *Tacca*, three of which are peculiar to Tropical America, and the rest to the Old World. *Tacca palmata*, Blume (*Tacca montana*, Rumph.), or an allied species, occurs in Timor Laut.

DIOSCOREACEÆ.

Dioscorea sp.

TIMOR LAUT.—The genus *Dioscorea* is a large one, numbering nearly 150 species, generally diffused in tropical and subtropical countries, and a few occurring in temperate regions. Several species are widely cultivated.

LILIACEÆ.

Dracæna angustifolia, Roxb.

Dracæna angustifolia, Roxb.; Benth., Fl. Austr., vii. p. 20; Baker in Journ. Linn. Soc. Lond., xiv. p. 526.
Cordyline rumphii, Miq., Fl. Ind. Bat., iii. p. 556, *partim*.

TIMOR LAUT.—A miniature tree, ranging from the Himalayas to North-eastern Australia. This is the only true *Dracæna* that reaches Australia. There are about thirty-five species of *Dracæna* spread over the warmer parts of the Old World; the Brazilian species is now referred to *Cordyline*.

Cordyline terminalis, Kunth.

Cordyline terminalis, Kunth; Baker in Journ. Linn. Soc. Lond., xiv. p. 539; Benth., Fl. Austr., vii. p. 21; Seem., Fl. Vit., p. 311; Mann in Proc. Amer. Acad., vii. p. 207.
Calodracon terminalis, Planch.; Miq., Fl. Ind. Bat., iii. p. 558.
Cordyline sepiaria, Seem., Fl. Vit., p. 311, t. 94.
Cordyline australis, Nadeaud, Enum. Pl. Tahiti, et Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 127, *non* Endl.

ARROU; TIMOR LAUT.—Generally spread over Tropical Asia and Polynesia, and North-eastern Australia. There are several varieties cultivated in Polynesia, and Seemann states that it is not wild in the Fijis. Mann also indicates it as one of those plants introduced into the Sandwich Islands by the aborigines. Both Jouan and Nadeaud confound it with the very distinct New Zealand *Cordyline australis*, which bears in common with it the native name "Ti." It appears to exist in almost all of the Pacific Islands, where all parts of the plant are employed in some way. There are about nine species, ranging from India to Australia and New Zealand, where there are four species, and a tenth in Brazil.

Dianella ensifolia, Redouté?

Dianella ensifolia, Redouté, Lil., t. 1? Benth., Fl. Austr., vii. p. 16; Miq., Fl. Ind. Bat., iii. p. 560; Seem., Fl. Vit., p. 312; Nadeaud, Enum. Pl. Tahiti, p. 34.

ARROU.—There is a little doubt about our plant being the true *Dianella ensifolia*, which is widely spread in Tropical Asia, in the Mascarene and Pacific Islands; also occurring in North-eastern Australia. *Dianella odorata* inhabits the Sandwich Islands, another is found in New Caledonia, a third in New Zealand and Norfolk Island. Finally there are five species in Australia, and four of these are endemic.

COMMELINACEÆ.

Pollia sorzogonensis, Endl.

Pollia sorzogonensis, Endl.; Clarke in DC. Monogr. Phanerog., iii. p. 126; Miq., Fl. Ind. Bat., iii. p. 541.

Aclisia sorzogonensis, E. Mey. in Presl, Reliq. Hænk., i. p. 138, t. 24.

Arrou; Ki; Timor Laut.—Common throughout India, the warmer parts of China, and the Archipelago, and extending to the New Hebrides.

Commelina nudiflora, Linn.

Commelina nudiflora, Linn.; Clarke in DC. Monogr. Phanerog., iii, p. 144.

Timor Laut.—As circumscribed by Clarke, this is generally diffused in warm countries, including Polynesia. The synonymy is very copious, embracing the names *Commelina pacifica*, Vahl, *Commelina cajennensis*, Rich., and *Commelina agraria*, Kunth. A second species was collected in Arrou. The genus numbers about 100 species, several of them having a wide range, like the present.

FLAGELLARIEÆ.

Flagellaria indica, Linn.

Flagellaria indica, Linn.; Miq., Fl. Ind. Bat., iii. p. 249; Benth., Fl. Austr., vii. p. 10.

Arrou; Timor Laut.—A climbing shrub, exceedingly common, especially in maritime districts, in Tropical Asia, Africa, including the Mascarene Islands, and Australia. There are also specimens in the Kew Herbarium from New Ireland and the Solomon Islands, but it does not appear to reach Eastern Polynesia, where, in the Fijis and Samoa, it is replaced by the only other species of the genus, *Flagellaria gigantea*, Hook. f., in Hook. Ic. Pl., t. 1429.

PALMÆ.

Calamus spp.

Arrou.—Specimens of two species of this genus, which has its headquarters in the Archipelago, are in the collections. Nearly 200 species are known, mostly inhabiting Tropical and Subtropical Asia; a few only Tropical Africa and Australia.

Cocos nucifera, Linn.

Cocos nucifera, Linn.; Benth., Fl. Austr., vii. p. 143; Seem., Fl. Vit., p. 275; Miq., Fl. Ind. Bat., iii. p. 64; Nadeaud, Enum. Pl. Tahiti, p. 40; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 127, 136, 145; Mann in Proc. Amer. Acad., vii. p. 204; Moseley, Notes of a Naturalist on the Challenger, p. 367; Wallace, Malay Archipelago, ii. p. 267, *cum icone*.

Arrou; Ki.—The cocoa-nut is essentially a littoral palm, though it will grow inland, and it is now found on nearly all tropical sea-coasts, including Polynesia. Where it originated

will probably never be proved, for it has so long been widely spread, both wild and cultivated, and has names in so many languages, that those who have entered most fully into the subject have been unable to arrive at a satisfactory conclusion. De Candolle[1] states he formerly believed it to have spread from Western America, but with fuller data and more experience in such questions, he inclines to the opinion that its original home is the Indian Archipelago; but as the thirty other species belonging to the genus are restricted to Tropical America, the first opinion seems the sounder. Jouan, *loc. cit.*, p. 128, says that it is not very widely spread in the Marquesas, though there are always groups of it near the houses of the natives. He further observes that its present wide range is not so much owing to the action of oceanic currents as is generally supposed, because, unless buried in or fixed to the soil, the seed perishes. Mann places it in the category of plants introduced into the Sandwich Islands by the aborigines. Neither this nor any other palm inhabits the Galapagos.

Nipa fruticans, Wurmb.

Nipa fruticans, Wurmb.; Miq., Fl. Ind. Bat., iii. p. 150; F. Muell., Syst. Census Austr. Pl., p. 120; Wallace, Malay Archipelago, ii. p. 200.

ARROU.—This is inserted on the authority of Wallace. It is exceedingly common on the sea-shores of Tropical Asia, from the mouths of the Ganges and the Philippines to New Guinea and North-eastern Australia; it also occurs in the Solomon Islands.

Orania aruensis, Beccari. (Plate LXV. I.)

Orania aruensis, Beccari, Malesia, i. p. 76.

ARROU.—Collected by Dr Beccari in the island of Wokan. For further particulars of this palm consult the list of stranded seeds from the Arrou Islands in the Appendix.

PANDANEÆ.

Pandanus spp.

Pandanus, spp.; Wallace, Malay Archipelago, ii. p. 175.

ARROU.—There are fruits of two or three species of *Pandanus* in the collection. The genus comprises at least fifty species, spread over Tropical Asia, Africa, Australia, and Polynesia, but specially numerous in the Archipelago and the Mascarene Islands, where, in certain districts, they form a very conspicuous feature in the vegetation.

AROIDEÆ.

Imperfect specimens of several members of this Order were collected in the South-eastern Moluccas, among them a variety of *Pothos scandens*, or an allied species, and a

[1] Origine des Plantes cultivées, p. 350.

second species of the same genus; both from the Arrou Islands. There is also what appears to be an *Aglaonema* from the same islands, and a large fruit-bearing specimen of an Aroid from Ki.

NAIADACEÆ.

Zostera nana, Roth.

Zostera nana, Roth.; Kunth, Enum. Pl., iii. p. 19; Benth., Fl. Austr., vii. p. 176.
Zostera muelleri, Irmisch; Aschers. in Linnæa, xxxv. p. 168.

ARROU.—Coasts of Southern Australia, Tasmania, and New Zealand, as well as in the northern hemisphere in the Old World.

CYPERACEÆ.

Cyperus ferax, A. Rich.

Cyperus ferax, A. Rich.; Benth., Fl. Austr., vii. p. 286; Clarke in Journ. Linn. Soc. Lond., xx. p. 295, et xxi. p. 191.

TIMOR LAUT.—Widely spread over the tropics, both in America and the Old World.

Cyperus pennatus, Lam.

Cyperus pennatus, Lam.; Benth., Fl. Austr., vii. p. 284; Miq., Fl. Ind. Bat., iii. p. 281; Seem., Fl. Vit., p. 319; Nadeaud, Enum. Pl. Tahiti, p. 33.

TIMOR LAUT.—Widely spread in Tropical Asia and Polynesia; also in Australia and the Seychelles. It is a sea-shore plant.

GRAMINEÆ.

Panicum sanguinale, Linn.

Panicum sanguinale, Linn.; Benth., Fl. Austr., vii. p. 469; Seem., Fl. Vit., p. 325; Nadeaud, Enum. Pl. Tahiti, p. 31.
Digitaria sanguinalis, Scop.; Miq., Fl. Ind. Bat., iii. p. 437.

TIMOR LAUT.—This grass is found almost everywhere in tropical and subtropical countries.

Setaria macrostachya, H.B.K.

Setaria macrostachya, H.B.K., Nov. Gen. et Sp., i. p. 110; Benth., Fl. Austr., vii. p. 493.
Setaria italica, Miq., Fl. Ind. Bat., iii. p. 467, non Beauv.?

TIMOR LAUT.—Common in many parts of Tropical America; also occurring in India, but less commonly, according to Bentham, and in Eastern Australia.

Setaria verticillata, Beauv.

Setaria verticillata, Beauv., Agrost, p. 51; Kunth, Enum. Pl., i. p. 152; Benth., Fl. Austr., vii. p. 494.

TIMOR LAUT.—Almost universally dispersed, as a weed of cultivation, in warm and temperate countries.

Cenchrus calyculatus, Cav.

Cenchrus calyculatus, Cav., Ic. Pl., v. p. 39, t. 463; Kunth, Enum. Pl., i. p. 167; Benth., Fl. Austr., vii. p. 497.
Cenchrus anomoplexis, Labill., Sert. Nov. Caled., p. 14, t. 19; Seem., Fl. Vit., p. 324.

ARROU.—A common littoral grass throughout Polynesia, from New Caledonia and the Fijis to Pitcairn Island. The genus comprises about twelve species, generally diffused in tropical and subtropical regions. *Cenchrus echinatus* is a very widely spread sea-shore sand-binding plant, and Nadeaud includes it in his Enumeration of Tahitian Plants, but we have only seen *Cenchrus calyculatus* from Polynesia. The prickly involucres of the inflorescence of these grasses attach themselves to the clothes and other things, and are thus conveyed from place to place.

Stenotaphrum subulatum, Trin.

Stenotaphrum subulatum, Trin.; Baker, Fl. Maurit., p. 440.

KI.—It is a little doubtful whether the Ki plant is this species, which inhabits the sea-shores of the Archipelago, Polynesia, and the Mascarene Islands, or *Stenotaphrum americanum*, Schrank (Benth., Fl. Austr., vii. p. 500), which is found on nearly all tropical and subtropical shores.

Spinifex squarrosus, Linn.

Spinifex squarrosus, Linn.; Miq., Fl. Ind. Bat., iii. p. 474.

LAKOR; LETTI.—An exceedingly common grass on the sandy sea-shores of Tropical Asia, entirely covering large expanses, according to Miquel; yet it does not appear to extend to Australia, where three other species grow—the following, and one endemic; the third also inhabiting the coast of New Zealand and New Caledonia. This is the whole area of the genus.

Spinifex fragilis, R. Br.

Spinifex fragilis, R. Br., Prodr. Fl. Nov. Holl., p. 198.
Spinifex longifolius, R. Br., *loc. cit.*; Benth., Fl. Austr., vii. p. 504; Miq., Fl. Ind. Bat., iii. p. 474.

KI.—North and West Australia. The late General Munro named the Ki plant, and noted on the label, "very close to *Spinifex squarrosus*, except the foliage." Miquel records this species from Timor.

Coix lachryma, Linn.

Coix lachryma, Linn.; Miq., Fl. Ind. Bat., iii. p. 476; Seem., Fl. Vit., p. 326; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 144.

KI.—This grass is now common in the tropics of both hemispheres. We have seen no

Australian specimens, however, and there is little doubt that it was introduced into the New World.

Imperata arundinacea, Cyr.

Imperata arundinacea, Cyr.; Benth., Fl. Austr., vii. p. 536; Miq., Fl. Ind. Bat., iii. p. 514; Seem., Fl. Vit., p. 322.

KI.—This South European reed is common in Australia, occurring in all the colonies; it is also widely spread in the temperate and tropical regions of the Old World, and in South America.

Anthistiria gigantea, Cav.

Anthistiria gigantea, Cav., Ic. Pl., v. p. 36, t. 458.
Andropogon gigantea, Brongn.; Miq., Fl. Ind. Bat., iii. p. 506.

WETTER.—Widely spread in Tropical India, and throughout the Archipelago, but not known from Australia or elsewhere. As now circumscribed, *Anthistiria* comprises about ten species spread over the warmer parts of the Old World.

Eleusine indica, Gærtn.

Eleusine indica, Gærtn.; Benth., Fl. Austr., vii. p. 615; Miq., Fl. Ind. Bat., iii. p. 385; Nadeaud, Enum. Pl. Tahiti, p. 32; Seem., Fl. Vit., p. 322.

KI.—Almost everywhere in tropical and subtropical regions, and occurring in some temperate countries; often existing, however, as a colonist only.

Centotheca lappacea, Desv.

Centotheca lappacea, Desv.; Benth., Fl. Austr., vii. p. 640; Miq., Fl. Ind. Bat., iii. p. 398; Nadeaud, Enum. Pl. Tahiti, p. 32; Seem., Fl. Vit., p. 322.

ARROU.—The only species of the genus, generally spread over Tropical Asia and Africa, and throughout Polynesia. It has also been collected on the eastern coast of North Australia.

Bambusa sp. ?

Bambusa sp. ? Wallace, Malay Archipelago, ii. p. 200.

ARROU.—We have seen no specimens, therefore we cannot indicate the species, of which there may be several.

GYMNOSPERMEÆ.

GNETACEÆ.

Gnetum scandens, Roxb.

Gnetum scandens, Roxb., Fl. Ind., iii. p. 518; DC., Prodr., xvi. 2, p. 351.
Gnetum edule, Blume; Miq., Fl. Ind. Bat., ii. p. 1068.

Arrou.—Tropical India and the Archipelago, but not entering Australia. *Gnetum* comprises about fifteen species; generally spread in Tropical Asia, but only one is known to occur in Africa; one of the Archipelago species, *Gnetum gnemon*, has also been found in the Fijis.

CYCADEÆ.

Cycas circinalis, Linn.

Cycas circinalis, Linn.; Miq., Fl. Ind. Bat., ii. p. 1077; Seem., Fl. Vit., p. 268; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 147.

Arrou.—Taken in a broad sense, this species is widely dispersed in Continental Asia, as well as in the Archipelago and Polynesia, and it has also been collected at Cape York and Albany Island, North Australia, in Madagascar, and Western Tropical Africa.

At our request, Mr W. T. Thiselton Dyer has supplied the following particulars of the distribution of the forms of *Cycas circinalis* :—

"As far as I can make out, the forms of this species fall into two groups, of one of which the distribution is predominantly western, the other eastern. *Cycas circinalis*, Linn. (De Vriese, Descriptions et Figures des Plantes Nouvelles et Rares, 1851, tt. 4 et 5), we have from Western Tropical Africa and Madagascar (*Cycas thouarsii*, R. Br.; DC., Prodr., xvi. p. 528), and from Malabar and Ceylon, perhaps also from the Nicobars; and Miquel (Fl. Ind. Bat., ii. p. 1077) records it from the coast districts of Java, Sumatra, Borneo, Timor, and the Moluccas. *Cycas rumphii*, Miq. (De Vriese, Descr. et Fig., 1851, tt. 2 et 3), inhabits the Malay Peninsula? the Moluccas (including Arrou), the Admiralty Islands, Albany Island and Cape York, North Australia, the Solomon Islands (San Christoval, Milne); and a *Cycas* from South China may be this form.

"*Cycas celebica*, Miq. (*Cycas neocaledonica*, Hort.), comes close to *Cycas rumphii*, and might form perhaps a third group with more or less unarmed petioles. I am inclined to regard this as the Polynesian form. It is found in New Caledonia, New Britain, and the Fiji Islands, and to it belongs *Cycas seemanni*, Al. Br. With this must probably be placed *Cycas undulata*, Hort. *Cycas riuminiana*, Regel (Gartenflora, 1863, p. 16, *cum fig. arboris*), probably belongs to a different type. *Cycas papuana*, F. Muell., belongs to the same type as the Australian *Cycas media*, R. Br."

CRYPTOGAMÆ.

FILICES.

The fern vegetation of the Malayan Archipelago is very rich and varied, and the small collection made by Mr Moseley in the South-eastern Moluccas contained several new species. Mr J. G. Baker published a complete enumeration of all the ferns collected by the Challenger Expedition in the Malayan Archipelago and Polynesia, in the fifteenth volume of the Journal of the Linnean Society of London, together with descriptions of the new species. The following were collected in the South-eastern Moluccas by Mr Moseley.

Alsophila polyphlebia, Baker.

Alsophila polyphlebia, Baker in Journ. Linn. Soc. Lond., xv. p. 104.

Height of trunk up to 25 feet.—Frond ample, tripinnate. Rachis of pinnæ pale brown, slightly furfuraceous and rough with raised points. Pinnæ oblong-lanceolate, 2 feet long, 7–8 inches broad. Pinnules sessile, lanceolate-ligulate, 3½ to 4 inches long, an inch broad, cut down to the rachis into close, blunt, distinctly crenated tertiary segments, 2 lines broad. Texture thin, but firm. Both surfaces glabrous, the lower with a few minute bullate scales on the midrib of the tertiary segments. Veinlets 12–14-jugate, close, fine, distinct, deeply forked, the lowest one sometimes twice forked. Sori placed close to the costa, and a space from the edge, with a distinct space between each, sometimes 12–15 to a segment, absent from the upper third of the segment.

Arrou.

Trichomanes pyxidiferum, Linn.

Trichomanes pyxidiferum, Linn.; Hook. and Bak., Synopsis Fil., p. 81; Hook., Sp. Fil., i. p. 124; Hook. and Grev., Ic. Fil., t. 206; Benth., Fl. Austr., vii. p. 703.

Arrou.—Widely dispersed in the tropical regions of both hemispheres.

Davallia repens, Desv.

Davallia repens, Desv.; Hook. and Bak., Synopsis Fil., p. 93; Baker in Journ. Linn. Soc. Lond., xv. p. 106.

Arrou.—Spread nearly all over Tropical Asia, the Mascarene Islands, and Polynesia.

Davallia solida, Swartz., var. *ornata*, Wall.

Davallia solida, Swartz, var. *ornata*, Wall.; Benth., Fl. Austr., vii. p. 715; Hook. and Bak., Synopsis Fil., p. 95; Baker in Journ. Linn. Soc. Lond., xv. p. 106.

Aroru; Ki.—The varieties of this species are widely dispersed in Tropical Asia and Polynesia, and one is found in North-eastern Australia.

Davallia speluncæ, Baker.

Davallia speluncæ, Baker; Hook. and Bak., Synopsis Fil., p. 100; Benth., Fl. Austr., vii. p. 717; Baker in Journ. Linn. Soc. Lond., xv. p. 106.

ARROU.—Tropical Asia, Africa, and Polynesia, and also found in North-eastern Australia.

Lindsaya lobata, Poir.

Lindsaya lobata, Poir.; Hook. and Bak., Synopsis Fil., p. 111; Benth., Fl. Austr., vii. p. 720 (*Lindsæa*); Baker in Journ. Linn. Soc. Lond., xv. p. 106.

ARROU.—Tropical Asia, Polynesia, and North-eastern Australia.

Asplenium falcatum, Lam.

Asplenium falcatum, Lam.; Hook. and Bak., Synopsis Fil., p. 208; Benth., Fl. Austr., p. 746; Hook. f., Handb. Fl. N. Zeal., p. 372; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

KI.—Very widely spread in the tropics of the Old World, including Polynesia, and extending southward to New Zealand; also occurring in West Indies.

Asplenium laserpitiifolium, Lam.

Asplenium laserpitiifolium, Lam.; Hook. and Bak., Synopsis Fil., p. 215; Hook., Sp. Fil., iii. p. 171, t. 103; Benth., Fl. Austr., vii. p. 748; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

ARROU.—This species ranges from Assam in India and Chusan in China to North-eastern Australia and the South Pacific Islands.

Asplenium (Anisogonium) decussatum, Swartz.

Asplenium (Anisogonium) decussatum, Swartz; Hook. and Bak., Synopsis Fil., p. 243; Hook., Sp. Fil., iii. p. 259; Benth., Fl. Austr., vii. p. 751; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

ARROU.—Spread over the Malayan Archipelago and Polynesia, and extending to North-eastern Australia; also found in the Mascarene Islands and Tropical Africa.

Nephrodium (Eunephrodium) microchlamys, Baker.

Nephrodium (Eunephrodium) microchlamys, Baker in Journ. Linn. Soc. Lond., xv. p. 107.

Caudex absent. Stipe ½ foot, pale brown, scaleless, finely pilose. Lamina oblong-lanceolate, 2–3 feet long, 12–15 inches broad, bipinnatifid. Pinnæ, below the small entire top ones, about 40-jugate, sessile, linear-ligulate, the largest 7–8 inches long, ¾ to ⅞ inch broad, the lowest not reduced, cut down to a broad wing into close, blunt, entire, rather ascending lobes ⅛ inch broad, of which the lowest on the anterior side is rather larger than the rest. Texture membranous. Both sides finely pilose, and densely dotted with minute pale brown glands. Veinlets 12–16-jugate, the lowest pair forming a deltoid arch midway between sinus and costa, the next two pairs meeting at the sinus. Sori round, minute, forming a regular row nearer the costa than the edge of the lobes. Involucre minute, persistent.

KI.—General habit of *Nephrodium molle*, with very different sori and venation.

Nephrodium (Eunephrodium) pennigerum, Hook.

Nephrodium (Eunephrodium) pennigerum, Hook., Sp. Fil., iv. p. 82; Hook. and Bak., Synopsis Fil., p. 292; Baker in Journ. Linn. Soc. Lond., xv. p. 107.

ARROU.—Tropical Asia from the Himalayas, southward through the Archipelago, and also in Tropical Africa.

Polypodium (Dictyopteris) difforme, Blume.

Polypodium (Dictyopteris) difforme, Blume; Hook. and Bak., Synopsis Fil., p. 318; Baker in Journ. Linn. Soc. Lond., xv. p. 108.

ARROU.—Apparently restricted to the Archipelago and Polynesia.

Polypodium (Niphobolus) macropodum, Baker.

Polypodium (Niphobolus) macropodum, Baker in Journ. Linn. Soc. Lond., xv. p. 108.

Rhizome woody, short-creeping, a line thick, clothed with minute, adpressed, deltoid, black scales with brown border. Phyllopode 3–4 lines, clothed with scales, just like the rhizome. Proper stipes bordered very nearly to the base. Fronds all alike (barren and fertile), ligulate, very thick and rigid in texture, 4–8 inches long, $\frac{1}{2}$ to $\frac{3}{4}$ broad, the fertile portion contracted, the point acute, the base narrowed very gradually, the upper surface naked, the lower clothed with thin cottony tomentum, like that of *Polypodium adnascens*. Veins entirely hidden. Sori like those of *Polypodium adnascens*, occupying continuously the contracted upper half of the fronds, minute and immersed in the pale brown tomentum, 6–8 in an erecto-patent row between midrib and edge, and each showing distinctly on the upper side of the frond.

ARROU.—Differs from *Niphobolus adnascens*, var. *varius*, by its much thicker and more rigid texture, long phyllopode, and almost obsolete stipes.

Polypodium (Niphobolus) pachydermum, Baker.

Polypodium (Niphobolus) pachydermum, Baker in Journ. Linn. Soc. Lond., xv. p. 108.

Rhizome wide-creeping, 1 line thick, woody, flexuose, clothed with minute adpressed, lanceolate, black scales, with a brown border. Phyllopode very short. Stipes naked, $\frac{1}{2}$ to 1 inch. Fronds dimorphic; the barren ones oblanceolate-oblong, obtuse, 1–2 inches long, cuneate at the base, $\frac{1}{2}$ to $\frac{3}{4}$ inch broad; the fertile ones ligulate, 3–4 inches long. Veins quite immersed. Texture very thick and rigid, the upper surface naked; the lower with only a coating of minute stellate scales, visible under a lens, with a distinct bare space round each. Sori occupying the upper half or two-thirds of the fertile fronds, superficial, $\frac{1}{2}$ line broad, 6–8 in an erecto-patent row between the midrib and edge.

KI.—Nearest typical *Niphobolus adnascens*, but much thicker and more rigid in texture, with superficial sori as large as in *Polypodium lingua*, and only spaced lepidote scales.

Polypodium (Phymatodes) millisorum, Baker.

Polypodium (Phymatodes) millisorum, Baker in Journ. Linn. Soc. Lond., xv. p. 109.

Rhizome not seen. Stipes stout, with a narrow wing extending nearly to the base. Lamina linear-ligulate, 2–2½ feet long, 2–2½ inches broad at the middle, narrowed very gradually to both ends, rigidly coriaceous, quite free from hairs or scales on both surfaces. Veins fine, immersed, the main ones zig-zag, ½ to ¾ inch apart in the centre of the frond, distinct three-quarters of the way to the edge; areolæ copious, minute, with abundant free included veinlets. Sori ½ line broad, round, superficial, crowded, filling up the whole of the upper half or two-thirds of the frond, distinctly visible on the upper side.

Ki.—Differs from *Polypodium irioides* by its rigidly coriaceous texture, larger sori, and less distinct veins.

Polypodium phymatodes, Linn.

Polypodium phymatodes, Linn.; Hook. and Bak., Synopsis Fil., p. 364; Benth., Fl. Austr., vii. p. 769; Baker in Journ. Linn. Soc. Lond., xv. p. 110.

Arrou; Ki.—A very common fern, nearly all over the tropics of the Old World and Polynesia, and extending northward to the Loo Choo Islands and Japan.

Polypodium (Drynaria) quercifolium, Linn.

Polypodium (Drynaria) quercifolium, Linn.; Hook. and Bak., Synopsis Fil., p. 367; Benth., Fl. Austr., vii. p. 772; Baker in Journ. Linn. Soc. Lond., xv. p. 110.

Arrou; Ki.—This species ranges from Tropical India and China to Polynesia and North-eastern Australia.

Vittaria elongata, Swartz.

Vittaria elongata, Swartz.; Hook. and Bak., Synopsis Fil., p. 395; Benth., Fl. Austr., vii. p. 718; Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Arrou.—Widely spread over the tropics of the Old World.

Platycerium grande, J. Sm.

Platycerium grande, J. Sm.; Hook. and Bak., Synopsis Fil., p. 425; Benth., Fl. Austr., vii. p. 781; Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Arrou.—This fern ranges from Singapore through the Archipelago to Queensland and New South Wales.

Lygodium dichotomum, Swartz.

Lygodium dichotomum, Swartz; Hook. and Bak., Synopsis Fil., p. 437; Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Arrou.—Malayan Peninsula and Chusan southward through the Archipelago, but not recorded from Australia.

LYCOPODIACEÆ.

Selaginella inæqualifolia, Spring.

Selaginella inæqualifolia, Spring, Monogr. Lycopod., ii. p. 148; Baker in Journ. Linn. Soc. Lond., xv. p. 112.

Arrou; Ki.—Himalayas to Ceylon and Malacca, also in Sumatra; but we have seen no specimens from the islands intervening between this and the South-eastern Moluccas.

MUSCI.[1]

Thyridium fasciculatum, Mitt.

Syrrhopodon fasciculatus, Hook. et Grev. in Brewster's Edinb. Journ. Sci., iii. p. 225; C. Müll., Synopsis Musc. Frond., i. p. 529.

Arrou.—A few barren stems.

The fruit of this species appears to be everywhere rare. Specimens which seem to be but slight varieties in colour or density of foliage come from India, the Eastern Archipelago, Pacific Islands, Australia, and even the western coasts of South America. All the species referable to this group agree in having the primary stems creeping, with numerous branches more or less densely inserted, forming extended patches like *Macromitrium*, thus differing considerably from *Syrrhopodon* and *Calymperes*. The original *Codonoblepharum*, founded on *Codonoblepharum menziesii*, is in fact a *Zygodon* with a more complete peristome, without near affinity to *Thyridium* or *Syrrhopodon*. The calyptra in *Thyridium constrictum* (*Calymperes*, Sull.), found in the Sandwich Islands and also in Borneo, of which fertile stems were gathered in Samoa by the Rev. T. Powell, is very long, descending below the capsule, and is in the middle finely striate, but smooth above and below; it is thus similar to that of *Syrrhopodon*. The *Syrrhopodon obtusifolius*, Lindb. (Hedwigia, 1868, p. 21), described with obtuse leaves, may possibly be one of the states of *Thyridium fasciculatum*, which is very variable in the outline of the leaf points. A narrower leaved moss was described in Seemann's Flora Vitiensis as *Thyridium luteum*, and C. Müller has described another from the same region.

The Australian specimens were named by Hampe *Codonoblepharum subfasciculatum*.

Chætomitrium lancifolium, n. sp.

Caulis repens, ramis brevibus patentibus pinnatis; folia laxe compressa, patentia, lanceolata, acuta, brevissime binervia, concava, infra apicem excavata. Margine superiore implana apiceque flexuosa, serrulata, cellulis angustis dorso papillosa; perichætialia erecta, magis serrulata; theca in pedunculo brevi aspero inclinata, cylindracea; aperculo convexo breviter rostrato.

[1] By William Mitten, A.L.S., and limited to the collections of the Expedition.

Caulis 5 cm.; ramis 4–5 mm. longis cum foliis 2 mm. latis. Folia pallida, luteo-viridia, haud nitida, sicca parum mutata. Pedunculus ruber, 5 mm. longus.

ARROU.—Creeping over dead leaves.

A little smaller than *Chætomitrium rugifolium*, Sull. (Bot. U.S. Expl. Exp., p. 23, t. 22), with leaves of the branches much narrower.

Only one capsule seen with operculum, which may not be complete, for in this group the beak is generally prolonged.

More than thirty species are now known of this curious genus, which in foliage is often similar to some species of *Ectropothecium*, and sometimes to that of some *Meteoria*; the areolation is in all of very narrow cells like those of *Ctenidium*. In most cases the specimens are too scanty to give an adequate idea of their habit of growth; some appear to grow in spreading patches, others, as *Chætomitrium philippinense*, Mont., and *Chætomitrium volutum*, have the main stem creeping and adhering to twigs. These are provided with numerous simple branches which in *Chætomitrium philippinense* curve in various directions and have their foliage imbricate and slightly secund; but there is another species gathered in Borneo by Motley.[1]

Thuidium plumulosum, Dozy et Molk.

Thuidium plumulosum, Dozy et Molk., Bryol. Jav., ii. p. 118.

ARROU.—In very small quantity, barren. This species ranges from Java to New Guinea.

HEPATICÆ.[2]

Chiloscyphus argutus, Nees.

Chiloscyphus argutus, Nees in G. L. et N. Synopsis Hep., p. 183.

ARROU.—A single stem only. Widely spread in the southern hemisphere, and extending northward to the Caroline Islands and Nepal.

[1] *Chætomitrium bornense*, Mitt., n. sp.—Caulis primarius repens, ramis quamplurimis simplicibus rectis approximatis; folia dense inserta, in seriebus quinis imbricata, late ovalia, cymbiformia, concava, dorso scabra, apice breviter mucronata, marginibus incurvis serrulatis, nervis binis brevissimis; perichætium ad ramorum latera, foliis parvis; theca ovalis, suberecta, operculo conico subulato.

Caulis usque ad 2 decim. longus, ubique radicans, rami 2 cm. longi, 1 mm. crassi, nitidi. Pedunculus 3 mm. longus asper. Calyptra generis.

This approximates very nearly to *Meteorium*, especially to the species which, like *Meteorium tetragonum*, have their foliage arranged in a seriate manner, and the resemblance is increased by the shortness of the seta and the nearly erect but unequal-sided capsule; the peristome has the two cells of the external bands of the teeth confluent, and not divided by an interval through which the internal band is seen, as in the *Hookeriæ*.

[2] By W. Mitten, A.L.S.

Radula pinnulata, Mitt.

Radula pinnulata, Mitt. in Seem. Fl. Vit., p. 410.

ARROU.—One or two stems only. A small species with regularly pinnate stems and acute lobules; its fruit has not yet been seen. Originally described from specimens collected in the Isle of Pines, near New Caledonia.

Lejeunia subfusca, Nees.

Lejeunia subfusca, Nees in G. L. et N. Synopsis Hep., p. 315?

ARROU.—A barren specimen, which appears to be this or some closely allied species of the same colour.

Phragmicoma polymorpha, Lacoste.

Phragmicoma polymorpha, Lacoste, Synopsis Hep. Jav., t. 11.

ARROU.—In small quantity, and varying, with leaves quite entire without sinuations on the ventral margin, or, as in the figure, much sinuated, dentate, and angulate; the amphigastrium entire or dentate, and the perianth with two, three, or four ventral folds.

Frullania secundiflora, Mont.

Frullania secundiflora, Mont.; G. L. et N., Synopsis Hep., p. 433.

ARROU; KI.—Founded on Philippine Island specimens. The specimen from Arrou is small, and those from Ki old, but in full fruit.

LICHENES.

No lichens appear to have been collected in the South-eastern Moluccas, or, if any were collected, they were mislaid.

FUNGI.[1]

Agaricus (Flammula) sapineus, Fries.

Agaricus (Flammula) sapineus, Fries, Hymen. Europ., p. 251; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 41.

ARROU.—Europe; South India; Ceylon; Mauritius; Australia; United States; Cuba; Venezuela.

Agaricus (Panæolus) campanulatus, Linn.

Agaricus (Panæolus) campanulatus, Linn.; Fries, Hymen. Europ., p. 311; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 41.

ARROU.—Europe; Ceylon; United States; Cuba.

[1] The geographical distribution of the species is furnished by Dr M. C. Cooke.

Marasmius aruensis, Berkl.

Marasmius aruensis, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 41.

Pileo centro depresso fulvo subtiliter pulverulento; stipite gracili e basi crassiuscula oriundo e fulvo brunneo; lamellis fulvis.

Pileus $\frac{1}{2}$ to 1 inch wide; stem $\frac{1}{3}$ to $1\frac{1}{2}$ inch high.

ARROU.

Marasmius aleurocephalus, Berkl.

Marasmius aleurocephalus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

Pileo convexo aleuriato rugoso-plicato fulvo; stipite compresso brunneo basi incrassato.

Pileus $\frac{1}{4}$ inch across; stem $\frac{1}{2}$ inch high.

ARROU.

Marasmius direptus, Berkl.

Marasmius direptus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

Pusillus albidus rugosissimus; pileo primum horizontali demum reflexo; stipite centrali diepto; lamellis paucis adnatis crassiusculis acie obtusis.

About $1\frac{1}{2}$ lines across; stem torn off as the pileus is turned back and left in the centre; the rugose crumpled pileus, under a lens, is very peculiar.

ARROU.

Lentinus leveillei, Berkl.

Lentinus leveillei, Berkl. in Trans. Linn. Soc. Lond., xx. p. 112, et in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Surinam.

Lentinus hookerianus, Berkl.

Lentinus hookerianus, Berkl. in Hook. Kew Journ. Bot., 1851, p. 44; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—North India; Ceylon.

Lentinus strigosus, Berkl.

Lentinus strigosus, Berkl. in Fries, El., p. 47, et in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Ceylon; Cuba; Guiana; Brazil.

Lenzites applanata, Fries.

Lenzites applanata, Fries, Ep., p. 404; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU.—India; Ceylon; Malayan Peninsula; Mauritius; Demerara; Brazil.

Polyporus (Mesopus) xanthopus, Fries.

Polyporus (*Mesopus*) *xanthopus*, Fries, Obs., ii. p. 285; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Spread over all tropical countries.

Polyporus (Pleuropus) sanguineus, Fries.

Polyporus (*Pleuropus*) *sanguineus*, Fries, Ep., p. 444; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 45.

KI.—This is spread all over the tropics.

Polyporus (Pleuropus) affinis, Nees.

Polyporus (*Pleuropus*) *affinis*, Nees in Fries, Ep., p. 445; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Malayan Archipelago; Polynesia; Brazil.

Polyporus (Pleuropus) cochlear, Nees.

Polyporus (*Pleuropus*) *cochlear*, Nees in Nov. Act. Nat. Cur., xiii. t. 6; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Java.

Polyporus (Pleuropus) luteus, Nees.

Polyporus (*Pleuropus*) *luteus*, Nees in Fries, Ep., p. 445; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Nicobar Islands; Australia; Cuba; Brazil.

Polyporus (Pleuropus) meleagris, Berkl.

Polyporus (*Pleuropus*) *meleagris*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

Pileo flabelliformi stipite brevissimo affixo zonato radiato lineato brunneolo; margine lobato acutissimo quandoque striato; hymenio e pallido umbrino; poris angulatis hic illic sinuatis, dissepimentis rigidiusculis.

Pileus 2–3 inches across, $1\frac{1}{2}$ inches long; pores $\frac{1}{105}$ inch in diameter. Sometimes infundibuliform. There is a variety (a single specimen only) with a longer stem, which is slightly laccate.

ARROU.

Polyporus (Anodermei) armeniacus, Berkl.

Polyporus (*Anodermei*) *armeniacus*, Berkl. in Hook. Kew Journ Bot., 1856, p. 197; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Brazil.

Polyporus (Anodermei) abruptus, Berkl.

Polyporus (*Anodermei*) *abruptus*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

Durissimus, imbricatus, reviviscens; pileo lignicolori hic illic rufescente glabrato; hymenio noduloso, juniore pallido, seniore pallescente; poris punctiformibus.

Pilei by confluence 2–3 inches across, adnate, and decurrent behind, very rigid, the hymenium reproduced irregularly and nodulose. A coarse species.

ARROU.

Polyporus (Placodermei) australis, Fries.

Polyporus (*Placodermei*) *australis*, Fries, Ep., p. 464; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

A small form.

ARROU.—Generally distributed in the tropical regions of both hemispheres.

Polyporus (Placodermei) zonalis, Berkl.

Polyporus (*Placodermei*) *zonalis*, Berkl. in Hook. Lond. Journ. Bot., 1847, p. 504, et in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—India; Ceylon; Borneo; Southern United States; Cuba; Mexico; Brazil.

Polyporus (Placodermei) senex, Nees et Mont.

Polyporus (*Placodermei*) *senex*, Nees et Mont., Syll., p. 160; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 42.

ARROU.—Tropical Asia, Africa, and America, also the Admiralty Islands, and in America it extends northward to the Southern United States.

Polyporus (Placodermei) aruensis, Berkl.

Polyporus (*Placodermei*) *aruensis*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo dimidiato tenui sulcato-zonato radiato-rugoso primum pulverulento brunneo, margine tenuiori, hymenio concolori; poris demum elongatis; contextu ferrugineo.

Pileus 2 inches across, $1\frac{1}{2}$ inches long; pores $\frac{1}{60}$ inch in diameter.

ARROU.

Polyporus (Inodermei) scruposus, Fries.

Polyporus (*Inodermei*) *scruposus*, Fries, Ep., p. 473; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Var. pileo duro reniformi velutino repetite sulcato-zonato umbrino contextu rhabarbarino.

ARROU.—India, Mauritius, Australia, and the warmer parts of America.

Polyporus (Inodermei) tabacinus, Mont.

Polyporus (*Inodermei*) *tabacinus*, Mont. in Ann. Sc. Nat., 1835, iii. p. 349; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU.—Mauritius, Australia, New Zealand, Juan Fernandez and Chili, to Mexico.

Polyporus (Inodermei) floridanus, Berkl.

Polyporus (Inodermei) floridanus, Berkl. in Ann. Nat. Hist., x. p. 376; et in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU.—British North America, southward through the West Indies and Mexico, to Bolivia and Brazil.

Trametes occidentalis, Fries.

Trametes occidentalis, Fries; Klotzsch in Linnæa, viii. p. 486; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU; KI.—Generally diffused in tropical and subtropical regions.

Trametes cognatus, Berkl.

Trametes cognatus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo dimidiato sulcato-zonato subtiliter scabroso-tomentoso postice glabrescente ochraceo; hymenio plano, poris punctiformibus acie subtiliter tomentosis.

Pileus $1\frac{1}{2}$ inch across, 1 inch long; pores $\frac{1}{180}$ inch in diameter. Externally resembling *Trametes müllerí*, Berkl.; but the pores are very different.

ARROU.

Trametes sanguineus, Klotzsch.

Polyporus persoonii, Fries; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 45.

KI.—India; Ceylon; Burmah; Samoa and Friendly Islands; Gold Coast; Brazil.

Trametes bicolor, Berkl.

Trametes bicolor, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo reniformi lobato postice sanguineo, antice pallido ruguloso; hymenio umbrino; poris e subhexagonis elongatis; contextu pallido.

Pileus 2 inches across, 1 inch long; pores $\frac{1}{60}$ inch in diameter.

ARROU.

Hexagona arata, Berkl.

Hexagona arata, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Tenuis rigidiuscula imbricata dimidiata v. flabelliformis regulariter sulcato-zonata scabroso-tomentosa umbrinella; hymenio e luteo-umbrino cinnamomeo; poris dentatis.

Pores $\frac{1}{48}$ inch in diameter. Allied to *Hexagona sericea*.

ARROU.

Hexagona similis, Berkl.

Hexagona similis, Berkl. in Hook. Lond. Journ. Bot., 1846, p. 4; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43 (*ubi errore affinis, fide* Cooke).

ARROU.—Ceylon; Australia.

Favolus saccharinus, Berkl.

Favolus saccharinus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo flabelliformi sessili subtiliter velutino glabrescente; poris sinuatis flexuosis.

Pileus $\frac{1}{2}$ to 1 inch across, at first very minutely velvety, so as to have a saccharine appearance; pores arranged in lines proceeding from a common base.

ARROU.

Favolus brasiliensis, Fries.

Favolus brasiliensis, Fries, Ep., p. 498; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

ARROU.—North India; Ceylon; Southern United States; Cuba; Surinam; Brazil.

Laschia longipes, Berkl.

Laschia longipes, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo tenui umbilicato pallide aurantiaco, margine lobato; stipite elongato sursum dilatato fissili; poris brevibus angustis sinuatis radiantibus.

About 1 inch across; stem 2 inches high, not $\frac{1}{12}$ inch thick. Specimen bad, but very distinct.

ARROU.

Dædalea indurata, Berkl.

Dædalea indurata, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 43.

Pileo albido, disco parvo affixo radiata-rugoso marginem versus zonato; hymenio ochroleuco; poris minutis sinuosis.

Pileus $1\frac{1}{2}$ inches across, 1 long; pores $\frac{1}{60}$ inch in diameter. A very distinct species, of which there is a single specimen only.

ARROU.

Irpex maximus, Mont.

Irpex maximus, Mont., Syll., p. 174; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—Cuba; San Domingo.

Stereum lobatum, Fries.

Stereum lobatum, Fries, Ep., p. 547; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—Very widely dispersed in both hemispheres, though it is not recorded from Europe.

Stereum vespilloneum, Berkl.

Stereum vespilloneum, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Tenue flabelliforme vertice parvo orbiculari affixo; pileo badio rufo zonato velutino; hymenio badio, margine sterili pallido.

Pileus $2\frac{1}{2}$ to 3 inches across, 2 inches long, then repeatedly zoned velvety, with a few dark, nearly smooth interstices.

ARROU.

Stereum effusum, Berkl.

Stereum effusum, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Pallidum margine inflexo lacerato-lobato, lineato pulverulento; hymenio lineato.

Pileus by confluence 3 inches wide, sometimes scarcely lineate, and then more pulverulent.

ARROU.

Stereum induratum, Berkl.

Stereum induratum, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Durissimum conchiforme concentrice sulcatum velutinum; hymenio lævi subtiliter pulverulento, contextu rhabarbarino.

Pileus 3 inches across. Distinguished at once by its very hard thick substance from *Stereum ostreatum* and its allies.

ARROU.

Thelephora lamellata, Berkl. et Curt.

Thelephora lamellata, Berkl. et Curt. in U.S. Expl. Exped., xvii. p. 199, t. 1, fig. 7; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—There is also a specimen in the collection from Taviuni given by Dr Good, of H.M.S. "Dido."

Lachnocladium furcellatum, Lév.

Lachnocladium furcellatum, Lév. in Ann. Sci. Nat., 1846, v. p. 159; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—Ceylon; Mauritius; Cuba; Surinam; Brazil.

Lachnocladium semivestitum, Berkl. et Curt.

Lachnocladium semivestitum, Berkl. et Curt, Grevillea, North Amer. Fungi, No. 226; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—United States; Gaudaloupe; Australia.

Hirneola rufa, Berkl.

Hirneola rufa, Berkl. in Ann. Nat. Hist., x. p. 384, et Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—New Caledonia; North Australia; Sandwich Islands; Cuba; Brazil.

Peziza hindsii, Berkl.

Peziza hindsii, Berkl. in Hook. Lond. Journ. Bot., 1842, p. 456, et in Journ. Linn. Soc. Lond., xvi. p. 44; Cooke, Mycographia, t. 51, fig. 200.

ARROU.—Ceylon; Admiralty Islands; New Ireland; San Domingo; Cuba; Guiana; Brazil.

Xylaria piliceps, Berkl.

Xylaria piliceps, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

Clavula subturbinata coffeata rimosa molli fragili ostiolis subprominulis punctata; stipite gracili concolori laccato rimoso, contextu pallido.

Stem 1¼ inches high; head ½ inch high, ⅓ inch wide. No sporidia were found.

ARROU.

Hypoxylon (Daldinia) vernicosum, Fries.

Hypoxylon (Daldinia) vernicosum, Fries; Saccardo, Syllog., i. p. 394; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 45.

KI.—India; United States; Cuba.

Hypoxylon (Daldinia) concentricum, Grev.

Hypoxylon (Daldinia) concentricum, Grev.; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 44.

ARROU.—A very widely dispersed species in temperate and tropical regions of both hemispheres.

ALCÆ.

Very few sea-weeds were collected by the Expedition in this region. Dr Dickie enumerates[1] the following, mostly quite common ones, from Arrou :—

Sargassum dentifolium, Turn. ? *Turbinaria vulgaris*, J. Agardh ; *Hormophysa articulata*, Kütz. ; *Padina pavonia*, Linn. ; *Dictyota dichotoma*, Huds. ; *Hydroclathrus cancellatus*, Bory ; *Amphiroa fragilissima*, Linn. ; *Melobesia verrucata*, Lamour. ; *Caulerpa clavifera*, Agardh ; *Halimeda macroloba*, Dene. ; *Halimeda opuntia*, Lamour. ; *Enteromorpha compressa*, Grev.

[1] *Journ. of the Linn. Soc. of Lond.*, xv. pp. 241, 242.

ADDENDA.

After it was too late to include them in the foregoing enumeration, we were reminded that Dr Beccari had published a number of plants from the Arrou Islands. Dr Beccari has visited the group himself, and, judging from the number of new species in the Orders which he has already elaborated, he must have made a considerable collection. Some further particulars of the vegetation of these islands by the same author, will be found in the Appendix on the drift seeds and seed-vessels.

MENISPERMACEÆ.

Parabæna tuberculata, Beccari.

Parabæna tuberculata, Beccari, Malesia, i. p. 137.

Arrou.—Also New Guinea and Timor. There is one other species of this genus, a native of India.

Tinospora crispa, Miers.

Tinospora crispa, Miers in Ann. Nat. Hist., series 2, vii. p. 38; Beccari, Malesia, i. p. 138.

Arrou.—Widely diffused in the Archipelago, from Sumatra and Java to New Guinea.

Hypserpa polyandra, Beccari.

Hypserpa polyandra, Beccari, Malesia, i. p. 148.

Arrou.—Also in New Guinea. *Hypserpa* is merged in the small Asiatic genus *Limacia* by Bentham and Hooker.

Stephania hernandifolia, Walp.

Stephania hernandifolia, Walp.; Beccari, Malesia, i. p. 154.

Ki.—Very widely diffused in Tropical Asia, Africa, and Australia.

Pachygone ovata, Miers.

Pachygone ovata, Miers; Beccari, Malesia, i. p. 158.

Ki.—This plant inhabits dry maritime regions in the Carnatic and Ceylon. It is also

in the Malayan Archipelago, ranging from Java to Timor, always preferring, according to Beccari, localities near the sea.

OLACINEÆ.

Ryticaryum oleraceum, Beccari.

Ryticaryum oleraceum, Beccari, Malesia, i. p. 121.

KI.—Dr Beccari subsequently described a second species of this genus from New Guinea.

Gonocaryum pyriforme, Scheff.

Gonocaryum pyriforme, Scheff., Ann. Bogor., i. p. 100; Beccari, Malesia, i. p. 123.

ARROU.—Also New Guinea and Amboina. Closely allied to the Indian *Phlebocalymna*.

ARALIACEÆ.

Osmoxylon carpophagarum, Beccari.

Osmoxylon carpophagarum, Beccari, Malesia, i. p. 196.

ARROU.—"Fruit eaten by various kinds of pigeons, as well as the sterile flower-buds, which exactly simulate the ripe berries."—*Beccari*.

Osmoxylon barbatum, Beccari.

Osmoxylon barbatum, Beccari, Malesia, i. p. 197.

KI.

RUBIACEÆ.

Myrmecodia aruensis, Beccari.

Myrmecodia aruensis, Beccari, Malesia, ii. p. 108.

ARROU.—The whole of the first part of the second volume of the Malesia is devoted to these and other plants which shelter ants ("Pianti Ospitatrici").

Myrmecodia echinata, Gaud.

Myrmecodia echinata, Gaud.; Beccari, Malesia, ii. p. 113.

ARROU.—This species also inhabits Rawak, an island on the north coast of Waigou.

Hydnophytum simplex, Beccari.

Hydnophytum simplex, Beccari, Malesia, ii. p. 123.

ARROU.—Both this and the foregoing genus are restricted to the Archipelago and the contiguous countries.

Hydnophytum kejense, Beccari.

Hydnophytum kejense, Beccari, Malesia, ii. p. 123.

KI.

Hydnophytum crassifolium, Beccari.

Hydnophytum crassifolium, Beccari, Malesia, ii. p. 124.

ARROU.—All the species of this genus are singularly local; not one being recorded from two different islands.

MYRISTICEÆ.

Myristica (Eumyristica) myrmecophila, Beccari.

Myristica (Eumyristica) myrmecophila, Beccari, Malesia, ii. p. 37, t. 1.

ARROU.—Also in New Guinea. The hollow branchlets are inhabited by a species of ant.

PALMÆ.

Areca macrocalyx, Zipp., *δ aruensis*, Beccari.

Areca macrocalyx, Zipp., *δ aruensis*, Beccari, Malesia, i. p. 20.

ARROU.—Found also in New Guinea.

Kentia costata, Beccari.

Kentia costata, Beccari, Malesia, i. p. 36.

This species, which is abundant in the paludal forests of Arrou, is said to be very closely allied to *Kentia moluccana*.

Drymophlœus propinquus, Beccari.

Drymophlœus propinquus, Beccari, Malesia, i. p. 43 et var. *β keiensis*, Becarri, *loc cit.*, p. 44.

ARROU; KI.

Caryota rumphiana, Mart.

Caryota rumphiana, Mart., *β papuana*, Beccari, Malesia, i. p. 70.

KI.—This species ranges from Java to New Guinea and North Australia.

Licuâla aruensis, Beccari.

Licuala aruensis, Beccari, Malesia, i. p. 83.

ARROU.—Closely allied to the New Guinea *Licuala penduliflora*, Zipp.

Korthalsia sp.

Korthalsia sp., Beccari, Malesia, i. p. 87.

ARROU.—Only fruit of this was collected, and Beccari remarks that it may belong to the New Guinea *Korthalsia zippelii*, Blume.

Calamus sp.

Calamus sp., Beccari, Malesia, i. p. 88.

ARROU.—Flowering specimens only known. *Calamus*, the largest genus of Palms, is especially abundant in the Archipelago.

MONIMIACEÆ.

Kibara coriacea, Endl.

Kibara coriacea, Endl., β *angustifolia*, Beccari, Malesia, i. p. 186.

ARROU.—This species ranges from the Malayan Peninsula and Sumatra and Java to Timor; and there are four other species of the genus endemic in North-eastern Australia, besides three new species discovered in New Guinea, and the following.

Kibara aruensis, Beccari.

Kibara aruensis, Beccari, Malesia, i. p. 188.

ARROU.

CONIFERÆ.

Podocarpus rumphii, Blume.

Podocarpus rumphii, Blume, Rumphia, iii. p. 214; Beccari, Malesia, i. p. 179.

ARROU and KI.—Also in New Guinea and Amboina.

THE ADMIRALTY ISLANDS.

INTRODUCTORY NOTES.

THE collection of plants made by Mr Moseley affords all that we know of the botany of the Admiralty Islands. Like that from the South-eastern Moluccas, it suffered much from damp before it reached this country, and many of the specimens were reduced to such a rotten state as to be past determination; this applies more especially to those unrecognisable from a fragment, consequently the identified species consist largely of familiar littoral plants. Practically, therefore, although Mr Moseley devoted the greater part of his time to collecting plants, the botany of the Admiralty Islands is still unknown; but from the following specimen it may safely be assumed that the peculiar element is not large, and consists mainly of species; for there are imperfect specimens of a considerable number of what are doubtless undescribed species of genera characteristic of the Malayan and Polynesian regions.

Two or three Algæ are recorded as having been previously collected at these islands by Gaudichaud, who was botanist to the French voyage round the world of the "Uranie" and "Physicienne" (1817–1820) commanded by Freycinet; and in the Botany of the voyage,[1] he mentions that they were becalmed for some days near the Admiralty Islands, yet no landing was made. What particularly struck him, was the large quantity of vegetable productions carried from the shores by the high tides, and borne hither and thither by the numerous currents which at that time alone disturbed the tranquillity of the sea. Further reference to this will be found in the Appendix to the present part, on the drift seeds and seed-vessels collected by the Challenger Expedition.

Mr Moseley contributes the following particulars of the aspect and vegetation of the islands:[2]—

"The Admiralty Islands are a group consisting of one large island and numerous small ones. The group lies between latitudes 1° 50′ S. and 3° 10′ S., and longitudes 146° E. and 148° 6′ E. It forms the north-westerly termination of the long curved chain of large islands and groups of islands which, stretching roughly N.E. and S.W., is composed of the New Ireland, Solomon, and

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[1] Voyage autour du monde, exécuté sur les corvettes de S. M. l'Uranie et la Physicienne; Botanique, p. 60.

[2] Notes on Plants Collected and Observed at the Admiralty Islands: *Journ. Linn. Soc. Lond.*, xv. p. 73.

New Hebrides groups. The large island of the Admiralty group is distant from New Hanover, the nearest large island of the chain, about 130 miles, and from the nearest point of New Guinea about 150 miles. A series of groups of small islands form connecting links between the Admiralty group and New Guinea; and a number of the smaller islands of the Admiralty group lie between the large island and New Hanover. The centre of the large or main island is placed by D'Entrecasteaux in lat. 2° 18′ S. and long. 146° 44′ E. The island, which is oblong in form, is about fifty miles in extreme length, and sixteen in extreme breadth. It has, together with its immediately adjacent islets, an area of about 550 square miles. The main island is mostly of small elevation, but contains mountain-masses rising to a height of about 1600 feet, which were visible to the eastward of the anchorage of the Challenger in Nares Anchorage. The examination of the islands made by us was confined to the extreme north-western portion of the northern coast of the main island, in the neighbourhood of Nares Bay, and to the numerous small outlying islands which, lying just off the coast, shelter that anchorage.

"The land-surface in the vicinity of Nares Bay consists of a series of low irregular ridges rising one above another, with wide flat expanses at the heads of bays on the coast, which are scarcely or not at all raised above sea-level, and thus are in a swampy condition. The mountains appear from their form to be volcanic; and it is probable that the obsidian used by the natives for their spear-heads is procured in them. A trachytic lava was found to compose one of the outlying islands; and a similar rock was observed on the mainland where it commenced to rise. A platform of coral-sand rock forms the coast-line of the main island in many places; and a similar rock is the only component of most of the small outlying islands.

"From the position of the Admiralty Islands with regard to the equator, their climate is necessarily an extremely damp one. A great deal of exceedingly heavy rain fell during the stay of the Challenger. Rain fell on five days of the seven during which we were at Nares Anchorage, the total fall being 1·66 inches. The temperature of the air ranged between 86° and 75·5° F., the mean of maximum and minimum observations being about 80° F.; and the air was loaded with moisture. Dense clouds of watery vapour hung about the forest-clad ranges, keeping the mountains most frequently concealed; and in the evenings clouds of mist hung about the lower land, looking like smoke rising from between the densely packed trees. In a bay some miles to the eastward of the anchorage of the Challenger, the mouth of a small river, apparently the outlet of the drainage of the mountains on this side, was found, and also a very small brook; but running water was not elsewhere observed, and the rain probably drains to a large extent into the swamps.

"The main island, as viewed from seawards, is seen to be densely wooded everywhere. Along the summits of the ridges cocoa-nut palms show out against the sky, accompanied by areca palms, as can be made out on a nearer view. The general dark-green mass of vegetation on the hill-sides is festooned with creepers, and shows a peculiar horizontal banding of somewhat lighter green, due to the presence in abundance of a leguminous tree (*Acacia ?*), which has its branches and leaves spread in a succession of horizontal layers, contrasting strongly with the general mass of more vertically directed foliage. A closely similar appearance strikes the eye at first sight on viewing the vegetation of the Banda Islands. The tree producing the effect is probably the same in both cases. Unfortunately, of this, as of all the other high trees, no specimens were procured.

"The smaller outlying islands, dotted about in front of the main island, are all thickly wooded. The inhabited ones are distinguished at once by the large number of cocoa-nut trees growing upon them, and forming the main feature of their vegetation.

"In several points of the coast there are mangrove swamps, in one of which I collected three species of mangroves. Where the land rises a little higher, so as not to be constantly overflowed by the tide, there is a sandy beach; and the shore is lined by various littoral trees, amongst which a *Barringtonia*, and a tree with oval leaves and a pear-shaped fruit with a stony kernel (*Ochrocarpus ovalifolius*, T. And.), are the most frequent. The trees overhang the sea with immense horizontal branches; and the bases of many of the trees are constantly washed by the waves; but, nevertheless, have large woody fungi growing upon them, sometimes so low down as also to be frequently immersed. The overhanging branches are loaded with epiphytes, all growing thus suspended over the sea, so that I had to wade up to my middle in order to gather many of them. Amongst these epiphytes are several species of orchids, five or six of which were found in flower or fruit, and a plant with woody stem and flowers sessile upon it with succulent bright pink calyces.[1] Growing with these is a *Hymenophyllum* in profusion, forming continuous sheets of green, a *Niphobolus*, and a *Lygodium*, which twines round the branches in all directions; whilst a *Psilotum* and the long light-green pendent fronds of *Ophioglossum pendulum* hang down from the branches in bunches. Further, a nearly white moss [*Leucophanes* sp. ?] forms large, rounded, compact cushions, conspicuous amongst the darker green of the other plants, and reminding me in its habit of antarctic rather than tropical vegetation. *Asplenium nidus* throws up its crowns of fronds in all directions from the branches in great abundance; and the curious inflated boles of a *Hydnophytum*,[2] many of them as much as 1¼ feet in diameter, are perched all about in the forks. I saw no specimens of *Myrmecodia armata*, which occurs so commonly with *Hydnophytum* in Aru and the Moluccas. The kind of littoral vegetation just described was seen best developed at Wyville Point.

"At another part of the coast, in the vicinity of the small river, where the shore, being less sheltered, and exposed to a heavy surf, is not encroached upon to its verge by large trees, several common littoral plants occurred which were not found elsewhere;—a small trailing bean with yellow flower [*Vigna lutea*]; a yellow-flowered composite, usually herbaceous, but here in places forming a woody shrub; the large *Crinum* so abundant on the shores at Aru and in the Philippines; and *Ipomœa biloba*, which, curiously enough, was nowhere very abundant. Three species of *Pandanus* grew here also, together with *Casuarina equisetifolia*, and a white-flowered apocynaceous tree with chocolate-coloured ovoid fruits, and an abundant milky juice [*Cerbera odollam*].

"In Nares Anchorage, not very far from our anchorage, and close to the main island, a small thickly-wooded island (Pigeon Island) is inhabited by immense numbers of a fruit-pigeon (*Carpophaga oceanica*).[3] Large numbers of these pigeons were killed; and I preserved specimens of the fruits contained in their crops, all of which fruits I failed to find or reach in the growing condition. Amongst the fruits were abundance of wild nutmegs and wild coffee-berries. The various species of *Carpophaga* must play a most important *rôle* in the distribution of plants, and especially trees, over the wide region inhabited by them. The crops of the birds are found to contain an astonishing quantity of fruits, some even larger than the nutmeg. Many of the fruits are entirely uninjured, and quite fit for germination; and since, when wounded, and probably also often when frightened, or by accident, the pigeons readily eject these fruits and constantly eject the hard kernels, these birds must constantly be transporting the seeds of trees from one island to another. As soon as ever a few littoral trees, such as *Barringtonia*, have established themselves by drifted seeds upon a fresh

[1] *Medinilla halogeton*, S. Moore, n. sp. [2] *Hydnophytum moseleyanum*, Beccari, n. sp.
[3] *Carpophaga rhodinolæma*, Sclater, Zool. Chall. Exped., part viii. p. 31.

coral island, the pigeons alight in their passages upon these trees and drop the germs of more inland trees. I saw the pigeons thus resting on one of the two or three trees as yet growing on Observatory Island, a very small islet in Nares Bay. At Banda formerly the growth of the nutmegs was confined by the Dutch Government to one island of the group, Great Banda, and the trees on the other islands were destroyed. It was found necessary, however, to send a Commission every year to uproot the young nutmeg-trees sown on the other islands, especially Gunong Api, by the fruit-pigeons. Some of the wild nutmegs in the stomachs of the birds from Pigeon Island were soft and partially digested, and unfit for germination.

"The main island immediately opposite Pigeon Island consists of a low swampy flat of coral sandstone covered with a dense growth of high trees. Immediately at the water's edge, along the sandy beach, are the usual littoral trees with banks of seaweeds thrown up at their roots, whilst a few yards inland a different set of trees, with tall straight trunks, grow, the trees being so closely set that it is very sensibly dark beneath them. Amongst these trees is one with a vermilion-red fruit,[1] which fruit was also found at Aru, and, lying thickly scattered on the mud beneath the tree, is a familiar object at both places, and which was further found on the sea-surface off the north coast of New Guinea amongst the driftwood from the Ambernoh river. Whilst the ground beneath is bare and muddy, and beset with the bare roots of the trees, the trunks of the trees and fallen logs in these dark swampy woods are covered with the most luxuriant growth of feathery mosses and *Jungermanniæ*. On one of these tree-trunks I found also a very curious fern, *Trichomanes peltatum*. The fronds of the fern are orbicular in form, and adhere in rows (as connected by the slender rhizome) to the bark. They are pressed absolutely flat against the bark, so as to look like an adhering crust, and have all the appearance of a *Riccia*, or some such form, for which, indeed, I took them when I gathered the specimens by cutting off flakes of the bark. At a few hundred yards inland are tracts covered with young sago palms, with several species of Zingiberaceæ and large swamp-ferns growing beneath them, and a *Sphagnum* in small quantities. On a collecting expedition to this part of the island I crossed the swamp, here about half a mile in width, and came to a steep rise in the land of about thirty feet or so. Here the rock appeared to be volcanic, and the soil, draining itself into the swamp below, was firm and comparatively dry. The vegetation here changed its aspect considerably; and a tree fern, about six feet in height, occurred at the verge of the rise, and also a *Melastoma*. The rising ground itself was covered with a dense growth of trees, with but little underwood. Beneath these trees grew in abundance isolated tufts of *Trichomanes javanicum*, the erect fern-like *Selaginella inæqualifolia* (so abundant in the Fijis, the Aru Islands, and the Moluccas), and a small zingiberaceous herb. I found many trees here which I had not met with in the swampy ground. They were covered with climbing Aroids, of only one species of which was I able to obtain fertile specimens.

"*Asplenium nidus*, and several epiphytic ferns of somewhat similar habit, were abundant; but I missed the large *Platycerium*, so abundant in the Aru Islands. The *Trichomanes javanicum* and all the low vegetation here was bound together by a horsehair-like *Rhizomorpha*, which was in such abundance as to be a hindrance in the securing of good specimens of the plants.

"Of palms I saw, on the whole, in the Admiralty Island, five species—the cocoa-nut, sago, and areca palms, a *Caryota*, and a small fan palm. I procured specimens of leaves only of the two latter. The fan palms appeared identical with one procured in the Aru Islands. I saw no rattans: but

[1] *Tabernæmontana* sp.

they grow in the islands; for in one canoe I saw a rattan stem in use as a cable. A young palm with prickly leaf-stalks, a dried specimen of which is sent, may prove to be of a further species.[1] The cocoa-nut palm is, as has been before mentioned, abundant on the inhabited islands, where young trees are planted by the inhabitants with great care around their villages, each young tree being protected from the numerous pigs or other injury by means of a neat wicker-work cylindrical fence. On the uninhabited islands cocoa-nut palms are occasionally, but not abundantly, present. The natives, however, plant the palms on uninhabited islands; for I found four or five young trees planted on Observatory Island, each carefully girt at its base with a circle of stones. Cocoa-nut palms grow also on the mainland, on the tops of the hill-ridges, mostly in clumps, as if one or a few trees originally established had seeded others around. There can be no doubt that these plants were planted by natives; and most probably the spot occupied by each clump was inhabited at some time. This part of the main island may formerly have been more thickly inhabited than it at present appears to be. I saw no dwarf varieties of the cocoa-nut; the trees are all of the common tall kind. The areca palm is abundant almost everywhere on the main island.

"The sago palm grows, as usual, socially, in swamps; as usual, also, there is a very large preponderance of immature examples which have not yet begun to form a stem. Indeed, it was only in one swamp that any stemmed specimens were met with at all. No doubt the natives lose no time in felling all the mature trees in spots easily accessible from the coast, and very often cut them before they are mature, for fear of their falling into other hands. A Cycad[2] is abundant, and grows occasionally to a height of thirty feet, looking like a palm.

"The three species of *Pandanus* met with are identical with the three found at the Aru Islands. The two larger ones were common and striking features in the aspect of the coast vegetation. I saw no bamboos in the islands, and they are not in general use amongst the natives; but I saw a few chunam boxes made of bamboo joints.

"Amongst the large forest trees an enormous *Ficus*, with the usual wonderful compound stem, was the most striking. A tree also with the vertical plank-like roots, a familiar phenomenon in Philippine forests, was common; but unfortunately, as usual, no specimens from the high trees could be obtained. A few flowers were picked up upon the ground; but it was found impossible to make out to which tree, amongst a number of trunks, a particular blossom spread over the ground belonged. Several araliaceous trees and shrubs were characteristic features of the vegetation. A bright-coloured *Coleus* was amongst the few terrestrial herbs. A *Dracœna*, often beautifully reddened, was common; but no brilliant crotons were seen. A bright-flowered malvaceous tree (*Thespesia populnea*) was amongst the littoral trees. Possibly this yields fibres for ropes, &c., to the natives.

"Fungi were abundant on the dead wood in the swamps and woods; and a considerable number of forms were collected, some of which, I think, are of special interest.[3]

"Seaweeds were cast up on the shores at every tide in great abundance, and yielded a greater variety of species than had before been met with by me on tropical coral coasts."

From Mr Moseley's sketch, and the following list of the plants collected, we can form some idea of how much remains to be done in the investigation of the flora of the Admiralty Islands. The table below is limited to the species of flowering plants which could be named with certainty.

[1] This has not been found.

[2] *Cycas circinalis*, Linn.

[3] A considerable proportion of the species collected were previously unknown.

TABLE *showing the Distribution of the Flowering Plants collected in the Admiralty Islands.*

Name.	Malayan Archipelago.	Australia.	Continental Asia.	Africa.	America.
MENISPERMACEÆ.					
Stephania hernandiæfolia	×	×	×	×	...
GUTTIFERÆ.					
Ochrocarpus ovalifolius	×	...	...	...	...
Calophyllum inophyllum	×	×	×	×	...
MALVACEÆ.					
Thespesia populnea	×	×	×	×	×
SIMARUBEÆ.					
Soulamea amara	×	...	...	...	...
OLACINEÆ.					
Cansjera leptostachya	...	×	...	...	...
RHAMNEÆ.					
Smythea pacifica	×	...	...	...	...
Colubrina asiatica	×	×	×	×	...
AMPELIDEÆ.					
Leea æquata	×	...	×	...	...
LEGUMINOSÆ.					
Desmodium unibellatum	×	×	×	×	×
Mucuna gigantea	×	×	×	...	...
Vigna lutea	×	×	×	×	×
Sophora tomentosa	×	×	×	×	×
ROSACEÆ.					
Parinarium laurinum	...	...	...	...	...
RHIZOPHOREÆ.					
Rhizophora conjugata	×	...	×	...	...
Bruguiera rheedii	×	×	×	×	...
Ceriops pauciflora	×	...	×	...	...
MYRTACEÆ.					
Eugenia malaccensis	×	...	×	...	...
Barringtonia speciosa	×	×	×	×	...
Barringtonia racemosa	×	...	×	×	...
MELASTOMACEÆ.					
Melastoma malabathricum	×	×	×	×	...
Medinilla halogeton	...	...	...	...	...
ONAGRARIEÆ.					
Jussiæa suffruticosa	×	×	×	×	×
RUBIACEÆ.					
Oldenlandia paniculata	×	...	×	...	...
Morinda citrifolia	×	×	×	×	×
Guettarda speciosa	×	×	×	×	...
Psychotria turbinata	...	...	...	...	...
COMPOSITÆ.					
Wedelia biflora	×	×	×	×	...

Name.	Malayan Archipelago.	Australia.	Continental Asia.	Africa.	America.
GOODENOVIEÆ.					
Scævola kœnigii	×	×	×	...	...
OLEACEÆ.					
Myxopyrum smilacifolium	×	...	×	...	...
APOCYNACEÆ.					
Cerbera odollam	×	×	×	×	...
Parsonsia spiralis	×	...	×	...	...
BORAGINEÆ.					
Tournefortia argentea	×	×	×	×	...
CONVOLVULACEÆ.					
Ipomœa biloba	×	×	×	×	×
SCROPHULARINEÆ.					
Limnophila serrata	×	×	...	...	...
Limnophila roxburghii	×	...	×	...	...
ACANTHACEÆ.					
Lepidagathis hyalina	×	...	×	...	...
Hemigraphis reptans	×	...	...	...	...
VERBENACEÆ.					
Callicarpa cumingiana	×	...	...	...	...
Clerodendron inerme	×	×	×	...	...
Premna taitensis	...	...	...	...	...
AMARANTACEÆ.					
Cyathula prostrata	×	...	×	×	...
MYRISTICEÆ.					
Myristica glabra	×	...	×	...	...
LAURINEÆ.					
Hernandia peltata	×	×	×	×	...
THYMELÆACEÆ.					
Phaleria blumei	×	×	...	...	...
EUPHORBIACEÆ.					
Euphorbia atoto	×	×	×	...	...
Codiæum variegatum	×	...	×	...	...
Manihot utilissima	×	...	×	×	...
Alchornea javensis	×	...	×	...	...
URTICACEÆ.					
Artocarpus incisa	×	...	×	...	...
Gironniera celtidifolia	×	...	...	...	...
Pipturus argenteus	×	×	...	...	...
Elatostema integrifolium	×	...	×	...	...
CASUARINEÆ.					
Casuarina equisetifolia	×	×	×	×	×
ORCHIDEÆ.					
Dendrobium nitidissimum	...	...	...	...	...
Dendrobium scopa	×	...	...	...	...

Name.	Malayan Archipelago.	Australia.	Continental Asia.	Africa.	America.
Agrostophyllum longifolium	×	...	...	...	...
Thelasis triptera	×	...	...	...	...
Tropidia effusa	...	...	...	...	...
SCITAMINEÆ.					
Clinogyne grandis	×	...	×	...	...
AMARYLLIDEÆ.					
Crinum asiaticum	×	×	×	...	...
TACCACEÆ.					
Tacca pinnatifida	×	×	×	×	...

Name.	Malayan Archipelago.	Australia.	Continental Asia.	Africa.	America.
PALMÆ.					
Cocos nucifera	×	×	×	×	×
CYPERACEÆ.					
Hypolytrum latifolium	×	×	×	×	...
Scleria sumatrensis	×	...	...	...	...
GRAMINEÆ.					
Ischæmum muticum	×	×	×	...	...
Oplismenus compositus	×	×	×	×	×
Centotheca lappacea	×	×	×	×	...
CYCADEÆ.					
Cycas circinalis	×	...	×	×	...

Out of a total of sixty-nine species of flowering plants, thirty-five are common to these islands and the South-eastern Moluccas, as a comparison with the table at p. 107 shows. Taking Polynesia as one area, sixty-three of the species extend to two areas; fifty-two to three areas; thirty-four to four areas; twenty-four to five areas; and ten to six areas: thus leaving only six species which are restricted to Polynesia. But, as already observed, the apparently endemic element in the collection does not figure in the table, because the condition of the specimens is such that they cannot be described. Whatever the real proportion of endemic species may prove to be, the fact will remain that a large number of the species are widely diffused plants. One, *Cansjera leptostachya*, was previously only known to inhabit Australia; and there are three, *Limnophila serrata*, *Phaleria blumei*, and *Pipturus argenteus*, only extending to the Malayan Archipelago and Australia. So far as it goes, this fragment of the flora of the Admiralty Islands is more Malayan in character than Polynesian.

ENUMERATION OF THE PLANTS.[1]

DICOTYLEDONES.—POLYPETALÆ.

MENISPERMACEÆ.

Stephania hernandiæfolia, Walp.

Stephania hernandiæfolia, Walp.; Benth., Fl. Austr., i. p. 57; Miq., Fl. Ind. Bat., i. 2, p. 83; Hook. f., Fl. Brit. Ind., i. p. 103.

ADMIRALTY ISLANDS.—Spread nearly all over Tropical Asia and Africa, and extending in Asia northward to Japan. In Australia it ranges from Cape York to Victoria, and there are specimens in the Kew Herbarium from Tahiti and Samoa. As circumscribed by Bentham, this includes *Stephania gaudichaudi*, A. Gr. (Bot. U.S. Expl. Exped., i. p. 37), and several other named forms. *Stephania forsteri*, A. Gr., *loc. cit.*, p. 36 (*Cocculus forsteri*, DC.), is also apparently the same species. Seemann does not mention this plant in his Flora Vitiensis.

GUTTIFERÆ.

Ochrocarpus ovalifolius, T. Anders.

Ochrocarpus ovalifolius, T. Anders., MSS. in Herb. Kew.
Calysaccion ovalifolium, Chois.; Miq., Fl. Ind. Bat., i. 2, p. 512.
Calophyllum excelsum, Zoll. in Nat. en Geneesk. Archief Néérl. Ind., ii. p. 558, *fide* Miq.

ADMIRALTY ISLANDS.—Malayan Archipelago.

Calophyllum inophyllum, Linn.

Calophyllum inophyllum, Linn.; Seem., Fl. Vit., p. 12; Nadeaud, Enum. Pl. Tahiti, p. 69; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 101; Mann in Proc. Amer. Acad., vii. p. 156.

ADMIRALTY ISLANDS.—A conspicuous seaside tree in Tropical Asia, Africa, Australia, and Polynesia.

[1] Full references and details of the distribution of those species which occur in the preceding enumeration of plants from the South-eastern Moluccas are not repeated here; the references being limited to the Polynesian literature, with an outline of the distribution.

MALVACEÆ.

Thespesia populnea, Corr.

Thespesia populnea, Corr.; Seem., Fl. Vit., p. 18; Nadeaud, Enum. Pl. Tahiti, p. 67; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 96 et 150.
Hibiscus bacciferus, Forst., Fl. Ins. Austr. Prodr., p. 48.

ADMIRALTY ISLANDS.—This is another very conspicuous seaside tree in tropical regions, especially when in flower. Besides being generally dispersed in the warm regions of the Old World, it is also in America and the West Indies. Whether introduced by man, or carried thither by other means, is uncertain. Mann does not include it in his list of Sandwich Island plants, but there are specimens in the Kew Herbarium thence, collected by Macrae and Diell, and Seemann records having collected it there himself. Forster collected it in Easter Island.

SIMARUBEÆ.

Soulamea amara, Lam.

Soulamea amara, Lam.; Seem., Fl. Vit., p. 34; Miq., Fl. Ind. Bat., i. 2, p. 129.
Cardiophora hindsii, Benth. in Hook. Lond. Journ. Bot., ii. p. 216, et in Bot. Voy. Sulphur, p. 181.

ADMIRALTY ISLANDS.—This tree is found in Java and Borneo, New Ireland, and Solomon Island; and there are other specimens in the Kew Herbarium, labelled "Fiji, Barclay," in the late Mr Bentham's handwriting; but Seemann, *loc. cit.*, states that it has not been collected in the Fiji group; and he is probably right, for Bentham himself (Hook. Lond. Journ. Bot., ii. p. 216) only records it from New Ireland. Another species has lately been discovered in the Seychelles; and there are two species of what may be the same genus from New Caledonia.

OLACINEÆ.

Cansjera leptostachya, Benth.

Cansjera leptostachya, Benth., Fl. Austr., i. p. 394.

ADMIRALTY ISLANDS.—A shrub originally discovered in New Ireland, and subsequently in some of the islands off the coast of Queensland, Australia. There are two or three other species in Tropical Asia.

RHAMNEÆ.

Smythea pacifica, Seem.

Smythea pacifica, Seem., Fl. Vit., p. 41, t. 11.

ADMIRALTY ISLANDS.—Also found in the Fijis and the South-eastern Moluccas.

Colubrina asiatica, Brongn.

Colubrina asiatica, Brongn.; Benth., Fl. Austr., i. p. 413; Seem., Fl. Vit., p. 42; Nadeaud, Enum. Pl. Tahiti, p. 71; Mann in Proc. Amer. Acad., vii. p. 161; Miq., Fl. Ind. Bat., i. 1, p. 648; Hook. f., Fl. Brit. Ind., i. p. 642; Oliver, Fl. Trop. Afr., i. p. 383.
Ceanothus capsularis, Forst., Fl. Ins. Austr. Prodr., p. 18.

ADMIRALTY ISLANDS.—Spread all over the tropics of the Old World, and throughout Polynesia, from New Caledonia to the Marquesas and the Sandwich Islands, growing chiefly in maritime districts. *Colubrina* is a genus of about a dozen species, two besides the present inhabiting Tropical Asia, and the rest America.

AMPELIDEÆ.

Leea æquata, Linn.

Leea æquata, Linn.; Clarke in Journ. Bot., 1881, p. 163.
Leea sambucina, Lawson in Hook. f. Fl. Brit. Ind., i. p. 666, *partim*.

ADMIRALTY ISLANDS.—India and the Malayan Archipelago. A fragment of a second species is in the collection from the Admiralty Islands.

SAPINDACEÆ.

Ratonia sp.

ADMIRALTY ISLANDS.—In the Flora of British India *Ratonia* is reduced to *Cupania*, which thus becomes a large genus, spread nearly all over the tropics, though only one species has been found in Africa.

LEGUMINOSÆ.

Desmodium umbellatum, DC.

Desmodium umbellatum, DC.; Seem., Fl. Vit., p. 56.

ADMIRALTY ISLANDS.—Asia, Africa, Australia, and America, and nearly all over Polynesia, though it does not appear to reach the Sandwich Islands. It is a half shrubby plant, often growing on the sea-beach.

Mucuna gigantea, DC.

Mucuna gigantea, DC.; Benth., Fl. Austr., ii. p. 254; Hook. f., Fl. Brit. Ind., i. p. 186; Seem., Fl. Vit., p. 59; Miq., Fl. Ind. Bat., i. 1, p. 213; Nadeaud, Enum. Pl. Tahiti, p. 80; Mann in Proc. Amer. Acad., vii. p. 164; A. Gr., Bot. U.S. Expl. Exped., p. 442.

ADMIRALTY ISLANDS.—Widely spread in Tropical Asia and Polynesia, and also found in Eastern Australia. Nadeaud states that in Tahiti it climbs over the trees of *Paritium tiliaceum* and *Barringtonia* on the sea-coast.

Vigna lutea, A. Gr.

Vigna lutea, A. Gr., Bot. U.S. Expl. Exped., p. 452; Seem., Fl. Vit., p. 62; Mann in Proc. Amer. Acad., vii. p. 164; Nadeaud, Enum. Pl. Tahiti, p. 80.

ADMIRALTY ISLANDS.—Spread nearly all over the warmer regions, but more especially in maritime districts.

Sophora tomentosa, Linn.

Sophora tomentosa, Linn.; A. Gr., Bot. U.S. Expl. Exped., p. 460; Seem., Fl. Vit., p. 66; Nadeaud, Enum. Pl. Tahiti, p. 81.

ADMIRALTY ISLANDS.—An essentially seaside tree, generally diffused in the warmer regions.

ROSACEÆ.

Parinarium laurinum, A. Gr.

Parinarium laurinum, A. Gr., Bot. U.S. Expl. Exped., i. p. 490, t. 55; Seem., Fl. Vit., p. 75.

ADMIRALTY ISLANDS.—This tree also inhabits the Solomon, Fiji, and Samoan Islands. The genus is spread over the tropical regions, more especially in maritime districts, both of the Old World and America. There is one other Polynesian species.

RHIZOPHOREÆ.

Rhizophora conjugata, Linn.

Rhizophora conjugata, Linn.; Miq., Fl. Ind. Bat., i. 1, p. 584; Hook. f., Fl. Brit. Ind., ii. p. 436.

ADMIRALTY ISLANDS.—Tidal marshes of Tropical Asia, from the Indus eastward, and through the Archipelago, but evidently by no means so common in the southern part of its area as *Rhizophora mucronata*. Henslow, in Hooker's Flora of British India, records it from Africa, but this seems to be a mistake, for there are no specimens in the Kew Herbarium. *Rhizophora mucronata*, Lam., is the common one in the Old World, extending to Eastern Africa, North-eastern Australia, and Polynesia; but, as Seemann remarks (Flora Vitiensis, p. 92), there is no evidence of the existence of true mangroves in Eastern Polynesia. Forster, according to Seemann, mentions a mangrove as occurring in the Society Islands, but there is no specimen of it in his herbarium, nor is there any in the recent collections. Neither Nadeaud nor Guillemin includes a mangrove. *Rhizophora mucronata* is common in the Fijis and in Samoa, and there is also a specimen in the Kew Herbarium from Funafuti in the Ellice group.

Bruguiera rheedii, Blume.

Bruguiera rheedii, Blume; Seem., Fl. Vit., p. 91; Benth., Fl. Austr., ii. p. 494.

ADMIRALTY ISLANDS.—Common in the mangrove swamps of many parts of the Old World, and extending in Polynesia as far as New Caledonia, the Fijis, and Samoa.

Ceriops pauciflora, Benth.

Ceriops pauciflora, Benth. in Hook. Lond. Journ. Bot., ii. 1843, p. 218.

ADMIRALTY ISLANDS.—Also found in New Ireland. It is, perhaps, not specifically different from *Ceriops candolleana*, Arn., which is widely diffused on the sea-coasts of the Old World, including North-eastern Australia and Eastern Africa. *Ceriops* is a small genus restricted to the Old World.

MYRTACEÆ.

Eugenia malaccensis, Linn.

Eugenia malaccensis, Linn.; Seem., Fl. Vit., p. 77; Nadeaud, Enum. Pl. Tahiti, p. 79; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 108 (*Jambosa*); Mann in Proc. Amer. Acad., vii. p. 166.

ADMIRALTY ISLANDS.—Generally diffused in Tropical Asia and Polynesia, but probably introduced in the eastern islands of Polynesia. Jouan states that it is very little spread in the Marquesas, only a few trees existing here and there; and Mann treats it as an introduced tree in the Sandwich Islands.

Barringtonia speciosa, Linn.

Barringtonia speciosa, Linn.; Seem., Fl. Vit., p. 82; A. Gr., Bot. U.S. Expl. Exped., p. 508; Nadeaud, Enum. Pl. Tahiti, p. 79; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 108, 135, 147, et 167.

Barringtonia butonica, Forst., Char. Gen. Pl., t. 38.

ADMIRALTY ISLANDS.—Generally spread in Polynesia, except the Sandwich Islands.

Barringtonia racemosa, Blume?

Barringtonia racemosa, Blume? Seem., Fl. Vit., p. 83.

ADMIRALTY ISLANDS.—The true *Barringtonia racemosa* reaches the Fijis and Samoa.

MELASTOMACEÆ.

Melastoma malabathricum, Linn.

Melastoma malabathricum, Linn.; Hook. f., Fl. Brit. Ind., ii. p. 523; Benth., Fl. Austr., iii. p. 292; Miq., Fl. Ind. Bat., i. 1, p. 507.

Melastoma polyanthum, Blume; Miq., Fl. Ind. Bat., i. 1, p. 507; Hook. f., Fl. Brit. Ind., ii. p. 523.

Melastoma denticulatum, Labill., Sert. Austr. Caled., i. p. 65, t. 64; Seem., Fl. Vit., p. 90.

Melastoma velutina, Seem., Fl. Vit., p. 90, *in nota*.

ADMIRALTY ISLANDS.—As circumscribed by Bentham, this species is very widely spread in Tropical Asia, and extends to Eastern Australia southward to New South Wales. It is also found in the Seychelles, and in Polynesia it reaches New Caledonia, the Fijis, and Samoa. It is very variable. The genus *Melastoma* is restricted to about the same area as the present species.

Medinilla halogeton, S. Moore.

Medinilla halogeton, S. Moore in Journ. Bot., 1880, p. 3.

ADMIRALTY ISLANDS.—A previously undescribed species; and there is a very imperfect specimen of what may be another new species from the same islands. A genus of about fifty species confined to the Old World, and principally concentrated in the Malayan Archipelago.

ONAGRARIEÆ.

Jussiæa suffruticosa, Linn.

Jussiæa suffruticosa, Linn.; Benth., Fl. Austr., iii. p. 307; Miq., Fl. Ind. Bat., i. 1, p. 628; Hook. f., Fl. Brit. Ind., ii. p. 587; Griseb., Fl. Brit. W. Ind., p. 273.
Jussiæa villosa, Lam.; Mann in Proc. Amer. Acad., vii. p. 166.

ADMIRALTY ISLANDS.—This herbaceous plant is now very widely diffused in warm countries in both hemispheres, but often existing only as a colonist. Seemann does not mention it in the Flora Vitiensis, but there are specimens in the Kew Herbarium from Samoa and Tahiti, and Mann records it from the Sandwich Islands, and places it in the category of plants probably introduced into the islands by the aborigines. Bentham treats it as indigenous in Australia.

GAMOPETALÆ.

RUBIACEÆ.

Hydnophytum moseleyanum, Beccari.

Hydnophytum moseleyanum, Beccari, Malesia, ii. p. 125 (*conspectus specierum*).

Description.—Tuber magnus, globosus. *Caules* plurimi succulenti, articulis cylindraceis, in extremitatibus vix compressis. *Folia* elliptica, vel ovato-elliptica, vel oblongo-lanceolata, apice parum attenuata et obtusa, basi in petiolum brevem, crassum, abrupte attenuata. *Inflorescentiæ* valde contractæ, tuberculiformes. *Flores* sessiles, fasciculati. *Calyx* cupularis, glaber, limbo brevissimo, integro, truncato, haud ciliato. *Corolla* in alabastro clavata, lobis ovatis, apiculo brevi introflexo præditis, basi inter stamina piloso-barbatis; fauce annulo barbato destituta. *Stamina* antheris basi sagittatis, loculis profunde diremptis, filamento brevi, supra medium affixis. *Stylus* filiformis, stigmate bipartito, in alabastro antheris brevior. *Fructus* . . . *Pyrenia* . . . Beccari MSS.—*Hydnophytum*, n. sp.? Oliver in H. N. Moseley's Notes on Plants, &c., in Journ. Linn. Soc., xv. p. 74.

ADMIRALTY ISLANDS.

Oldenlandia paniculata, Linn.

Oldenlandia paniculata, Linn.; Hook. f., Fl. Brit. Ind., iii. p. 69; Seem., Fl. Vit., p. 126.

ADMIRALTY ISLANDS.—Widely dispersed in Asia, and in Polynesia ranging from the New Hebrides to the Fiji and Tongan Islands.

Morinda citrifolia, Linn.

Morinda citrifolia, Linn.; Seem., Fl. Vit., p. 129; Nadeaud, Enum. Pl. Tahiti, p. 52; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, pp. 111, 135, et 151; Mann in Proc. Amer. Acad., vii. p. 170.

ADMIRALTY ISLANDS.—One of the commonest seaside trees in Polynesia, and generally diffused on tropical coasts.

Guettarda speciosa, Linn.

Guettarda speciosa, Linn.; Seem., Fl. Vit., p. 131; Nadeaud, Enum. Pl. Tahiti, p. 52.
Cadamba jasminiflora, Sonnerat, Voy., ii. t. 128.

ADMIRALTY ISLANDS.—Coasts of Tropical Asia, Eastern Africa and adjacent islands, North-eastern Australia, and almost throughout Polynesia, though we have seen no specimens, and it is not recorded from the Marquesas group by Jouan, nor from the Sandwich Islands by Mann. It abounds in the Fiji, Samoan, Gilbert, Ellice, Friendly, and Society groups, and it has also been collected in Radak and Romanzoff Islands by Chamisso, in Bow Island by Barclay, in Pitcairn Island by Menzies, and in Elizabeth Island by Cuming.

Psychotria turbinata, A. Gr.

Psychotria turbinata, A. Gr. in Proc. Amer. Acad., iv. p. 45; Seem., Fl. Vit., p. 135.

ADMIRALTY ISLANDS.—Also found in the Fijis. *Psychotria* is a genus of some 500 species, spread all over the tropics, and a few extend into subtropical regions; but the greatest concentration of species is in America. In Western Polynesia the species are numerous, and three and four occur as far east as Tahiti, while in the Fijis there are at least thirty species; but the genus does not appear to be represented in the Marquesas nor in the Sandwich Islands. One endemic species inhabits Juan Fernandez.

COMPOSITÆ.

Wedelia biflora, DC.

Wedelia biflora, DC.; Benth., Fl. Austr., iii. p. 539.

ADMIRALTY ISLANDS.—As circumscribed by Bentham, this includes the *Wollastonia forsteriana*, DC. (*Buphthalmum uniflorum*, Forst.), and *Wedelia insularis*, DC., and is spread nearly all over Polynesia, and in the maritime districts of Tropical Asia, Africa, and Australia; but there are several closely allied ill-defined species. One of these, *Wedelia strigulosa*, is recorded by Seemann (Flora Vitiensis, p. 142) as common on all the sea-beaches of the Fiji Islands.

GOODENOVIEÆ.

Scævola kœnigii, Vahl.

Scævola kœnigii, Vahl; Seem., Fl. Vit., p. 145; Nadeaud, Enum. Pl. Tahiti, p. 50; Benth., Fl. Austr., iv. p. 86.

Scævola sericea, Forst., Fl. Ins. Austr. Prodr., p. 89; Mann in Proc. Amer. Acad., vii. p. 187.

ADMIRALTY ISLANDS.—A common seashore shrub in the western groups of Polynesia, less so eastward, though it reaches the Sandwich Islands; also in Tropical Asia and Australia.

MYRSINEÆ.

Ardisia sp.

ADMIRALTY ISLANDS.—*Ardisia* comprises about 200 shrubby and arboreous species widely spread in tropical and subtropical regions, though very rare in Africa. The allied genus *Myrsine* is represented in New Zealand by about half a dozen species.

EBENACEÆ.

Diospyros sp.

ADMIRALTY ISLANDS.—Of this genus upwards of 150 species are described; they are generally spread in warm countries, and a few inhabit north temperate regions.

OLEACEÆ.

Myxopyrum smilacifolium, Blume.

Myxopyrum smilacifolium, Blume; Miq., Fl. Ind. Bat., ii. p. 550; Hook. f., Fl. Brit. Ind., iii. p. 618.

ADMIRALTY ISLANDS.—Tropical Asia, from the Himalayas southward into both peninsulas, and also in Borneo. The closely allied species (or variety) *Myxopyrum coriaceum*, Blume, is represented at Kew by specimens from Malacca, Sumatra, and Java. No other species of this distinct genus are known: it is the *Chondrospermum* of Wallich.

APOCYNACEÆ.

Cerbera odollam, Gærtn.

Cerbera odollam, Gærtn.; Benth., Fl. Austr., iv. p. 306; Hook. f., Fl. Brit. Ind., iii. p. 638.

Cerbera lactaria, Hamilt.; Seem., Fl. Vit., p. 158.

Cerbera forsteri, Seem., *loc. cit. in nota*; Nadeaud, Enum. Pl. Tahiti, p. 55.

Cerbera manghas, Linn.; Forst., Fl. Ins. Austr. Prodr., p. 19; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 114.

ADMIRALTY ISLANDS.—Tropical Asia and North-east Australia, and throughout Polynesia, except the Sandwich Islands. The plant collected in Pitcairn Island by Cuming,

and described by Seemann as a "distinct new species," which he named *Cerbera forsteri*, we agree with Nadeaud should rank as a variety of *Cerbera odollam*. Jouan states that this species is generally diffused in the Marquesas, though most frequent on the sides of the hills. It is also found in the Seychelles, but does not apparently reach Africa itself. There are three or four other species, which all inhabit maritime districts in the Old World.

Tabernæmontana sp.

ADMIRALTY ISLANDS.—There is a specimen of what is probably a species of this tropical genus; and among the seed-vessels picked up on the shore is one which has been identified as that of *Tabernæmontana aurantiaca*.

Parsonsia spiralis, Wall.

Parsonsia spiralis, Wall.; Hook. f., Fl. Brit. Ind., iii. p. 650.

ADMIRALTY ISLANDS.—Himalayas and China, to Ceylon and the South-eastern Moluccas.

ASCLEPIADEÆ.

Hoya sp.

ADMIRALTY ISLANDS.—This is probably a new species, but it is so closely allied to *Hoya diptera*, Seem., of which there are only two flowers at Kew, that we forbear naming it, more especially as authenticated specimens of many of the Malayan species are not to be seen in this country.

BORAGINEÆ.

Tournefortia argentea, Linn. f.

Tournefortia argentea, Linn. f.; Seem., Fl. Vit., p. 170; Nadeaud, Enum. Pl. Tahiti, p. 57.

ADMIRALTY ISLANDS.—Generally diffused on tropical shores in the Old World, and throughout Polynesia, except the Sandwich Islands. Cuming long ago collected it in Ducie Island, and Arundel recently gathered it in the same island, and he notes on his label that it is one of the commonest plants on the low islands in the South Pacific. See list of plants on p. 116 collected by the latter gentleman.

CONVOLVULACEÆ.

Ipomœa biloba, Forsk.

Ipomœa biloba, Forsk.; Hook. f., Fl. Brit. Ind., iv. p. 212.

Ipomœa pes-caprœ, Sweet; Seem., Fl. Vit., p. 172; Nadeaud, Enum. Pl. Tahiti, p. 58; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 116, 136, 148; Mann in Proc. Amer. Acad., vii. p. 195.

Ipomœa maritima, R. Br., Prodr. Fl. Nov. Holl., p. 486.

ADMIRALTY ISLANDS.—Almost everywhere in maritime districts of tropical and sub-tropical regions, including Polynesia, eastward to the Marquesas and Sandwich Islands.

SCROPHULARINEÆ.

Limnophila serrata, Gaud.

Limnophila serrata, Gaud.; Benth., Fl. Austr., iv. p. 490; Miq., Fl. Ind. Bat., ii. p. 680; Nadeaud, Enum. Pl. Tahiti, p. 59.
Limnophila fragrans, Seem., Fl. Vit., p. 180.
Ruellia fragrans, Forst., Fl. Ins. Austr. Prodr., p. 44.

ADMIRALTY ISLANDS.—Fijis, Tahiti, and North Australia, and Gaudichaud's original was from the Marianne Islands. It grows in swamps and stagnant pools on the coast. *Limnophila* is a genus of herbaceous marsh or aquatic plants, and comprises about twenty species spread over the warmer parts of the Old World.

Limnophila roxburghii, G. Don.

Limnophila roxburghii, G. Don; Hook. f., Fl. Brit. Ind., iv. p. 265.
Limnophila menthastrum, Benth.; Miq., Fl. Ind. Bat., ii. p. 680.
Adenosma triflora, Seem., Fl. Vit., p. 284, *non* Nees.

ADMIRALTY ISLANDS.—North India, China, Formosa, and the Philippines, southward to Java, the Fijis and Samoa.

ACANTHACEÆ.

Lepidagathis hyalina, Nees.

Lepidagathis hyalina, Nees.; Miq., Fl. Ind. Bat., ii. p. 815.

ADMIRALTY ISLANDS.—India and China to the South-eastern Moluccas.

Hemigraphis reptans, T. And.

Ruellia reptans, Forst., Fl. Ins. Austr. Prodr., p. 44; Seem., Fl. Vit., p. 183.

ADMIRALTY ISLANDS.—Southern Moluccas; New Hebrides.

VERBENACEÆ.

Callicarpa cumingiana, Schauer?

Callicarpa cumingiana, Schauer? Miq., Fl. Ind. Bat., ii. p. 887.

ADMIRALTY ISLANDS.—The typical *Callicarpa cumingiana* is from the Philippine Islands.

Clerodendron inerme, R. Br.

Clerodendron inerme, R. Br.; Seem., Fl. Vit., p. 188; A. Gr. in Proc. Amer. Acad., vi. p. 50.
Volkameria inermis, Linn., Fl. Zeyl., p. 231.

ADMIRALTY ISLANDS.—A common seaside shrub in Tropical Asia, Australia, and Western Polynesia.

Premna taitensis, Schauer.

Premna taitensis, Schauer; Seem., Fl. Vit., p. 186, t. 43; Nadeaud, Enum. Pl. Tahiti, p. 57.
Scrophularioides arborea, Forst., Fl. Ins. Austr. Prodr., p. 91.

ADMIRALTY ISLANDS.—This is common in the Fijis, in the Ellice group, Samoa, and eastward to the Marquesas.

INCOMPLETÆ.

AMARANTACEÆ.

Cyathula prostrata, Blume.

Cyathula prostrata, Blume; Seem., Fl. Vit., p. 199; Baker, Fl. Maurit., p. 269.

ADMIRALTY ISLANDS.—An annual herb, widely spread in Tropical Asia, Africa, and in Polynesia.

MYRISTICEÆ.

Myristica glabra, Blume, var.

Myristica glabra, Blume, var.; Miq., Fl. Ind. Bat., i. 2, p. 65.

ADMIRALTY ISLANDS.—From Silhet southward to Sumatra and Java.

LAURINEÆ.

Hernandia peltata, Meissn.

Hernandia peltata, Meissn.; Seem., Fl. Vit., p. 204; Nadeaud, Enum. Pl. Tahiti, p. 48.

ADMIRALTY ISLANDS.—Tropical Asia, Africa, and Australia, and eastward in Polynesia as far as Tahiti.

THYMELÆACEÆ.

Phaleria blumei, Benth.

Phalerja blumei, Benth., Fl. Austr., vi. p. 38.
Drymispermum blumei, Dene.; Miq., Fl. Ind. Bat., i. 1, p. 885.

ADMIRALTY ISLANDS.—Malayan Archipelago and North-eastern Australia. The genus is restricted to Tropical Asia, and the southern area of the present species.

EUPHORBIACEÆ.

Euphorbia atoto, Forst.

Euphorbia atoto, Forst.; Seem., Fl. Vit., p. 216; Nadeaud, Enum. Pl. Tahiti, p. 72; Benth., Fl. Austr., vi. p. 46.

ADMIRALTY ISLANDS.—India, Ceylon, Malayan Archipelago, and North-eastern Australia, and in Polynesia it extends eastward to Tahiti, and northward to the Marianne Islands, and closely allied species occur in Pitcairn, Elizabeth, and the Sandwich Islands.

Codiæum variegatum, Juss.

Codiæum variegatum, Juss.; Seem., Fl. Vit., p. 231; Benth., Fl. Austr., vi. p. 147.
Codiæum moluccanum, Dcne.; Miq., Fl. Ind. Bat., i. 2, p. 383.

Admiralty Islands.—Widely dispersed in Tropical Asia and Polynesia, but often cultivated. Seemann, *loc. cit.*, states that many varieties and subvarieties of this plant are cultivated for ornament in the Fijis.

Antidesma n. sp. ?

Admiralty Islands.—There is little doubt respecting this being an undescribed species, but as the specimen bears only two leaves and one cluster of fruit, it is insufficient for description. It is remarkable for the large size of its leaves, which are a foot in length and five inches across. The genus *Antidesma* is a large one, and spread over the warmer parts of the Old World, extending as far north in Asia as Japan. About half-a-dozen species inhabit Australia, and several Polynesia, including one endemic in the Sandwich Islands; but hitherto none has been discovered in America.

Manihot utilissima, Pohl.

Manihot utilissima, Pohl; DC., Prodr., xv. 2, p. 1064.

Admiralty Islands.—An American plant, now widely diffused through cultivation.

Alchornea javensis, Müll. Arg.

Alchornea javensis, Müll. Arg. in DC. Prodr., xv. 2, p. 905.

Admiralty Islands.—Malacca, Philippines, and Java. *Alchornea* comprises upwards of thirty species spread over the warmer regions of both hemispheres.

URTICACEÆ.

Ficus spp.

Admiralty Islands.—There are more or less imperfect specimens of eight or ten species of this vast genus, including perhaps some peculiar ones; but the described Malayan species, of which we have seen no authenticated specimens, are so numerous, that we dare not venture to make any new ones.

Artocarpus incisa, Linn.

Artocarpus incisa, Linn.; Seem., Fl. Vit., p. 255; Dcne., Herb. Timor. Descr., p. 169; Miq., Fl. Ind. Bat., i. 2, p. 285; Nadeaud, Enum. Pl. Tahiti, p. 44; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 121 et 147; Mann in Proc. Amer. Acad., vii. p. 201.

Admiralty Islands.—The Bread-fruit Tree is generally spread in the Malayan Archipelago and in Polynesia, where it was cultivated at the time of the earliest visits of Europeans; and it is naturalised in the West Indies. It is apparently wanting in the Arrou

Islands; see note thereon, *ante*, p. 117. De Candolle, however, says[1] that the Bread-fruit Tree is evidently a native of Java, Amboina, and the neighbouring islands; but it has been cultivated from such remote times that its exact history cannot be ascertained. This view is strengthened by the fact that the Archipelago is the home of the majority of the species of *Artocarpus*, very few reaching Continental Asia, and none except the cultivated ones, *Artocarpus incisa* and *Artocarpus integrifolia*. Further, tradition suggests a period when the Bread-fruit Tree did not exist in Tahiti. Nadeaud states that the climatic conditions of the interior of this island are unfavourable to it, and the varieties growing there wild or cultivated produce no seed, whereas in Tongatabu perfect seeds are always developed. Seemann says that it is cultivated throughout the Fiji Islands, and is also in some parts to all appearances wild. On the other hand, Jouan remarks that if it be not indigenous in the Marquesas, the very least trouble is taken in its cultivation, and he never saw any save the common variety there. He also adds that on his expedition d'Entrecasteaux carried 300 plants from Tongatabu to Java, and asks whether it previously existed in the latter island; and he interprets the Tahitian traditions as indicating a spontaneous origin of the Bread-fruit Tree in the Society Islands.

Gironniera celtidifolia, Gaud.

Gironniera celtidifolia, Gaud.; Miq., Fl. Ind. Bat., i. 2, p. 223; Seem., Fl. Vit., p. 236; Weddell in DC. Prodr., xvii. p. 207.

ADMIRALTY ISLANDS.—Philippines and Fiji Islands, and Weddell describes a form, which he regards as a variety of this, from St. George [New Georgia?] in the Solomon Archipelago. There are also specimens in the Kew Herbarium of the same or a closely allied species from Samoa. *Gironniera* is a small genus confined to Ceylon, the Malay Peninsula and Archipelago, Southern China, and the Pacific Islands.

Pipturus argenteus, Wedd.

Pipturus argenteus, Wedd.; Benth., Fl. Austr., vi. p. 185.
Pipturus propinquus, Wedd., Monogr., p. 447, t. 15; Seem., Fl. Vit., p. 244; Miq., Fl. Ind. Bat., i. 2, p. 268.
Urtica argentea, Forst., Fl. Ins. Austr. Prodr., p. 65.

ADMIRALTY ISLANDS.—Malayan Archipelago, North-eastern Australia, and in Polynesia from the New Hebrides and Friendly to the Fiji and Marianne Islands.

Elatostema integrifolium, Wedd.

Elatostema integrifolium, Wedd. in DC. Prodr., xvi. 1, p. 179.
Elatostema sesquifolium, Hassk.; Miq., Fl. Ind. Bat., i. 2, p. 243.

ADMIRALTY ISLANDS.—Widely dispersed in India, and extending through the Archipelago. *Elatostema* is a genus of about fifty species, confined to the Old World, and chiefly to Asia and Africa.

[1] Origine des Plantes Cultivées, p. 239.

CASUARINEÆ.

Casuarina equisetifolia, Forst.

Casuarina equisetifolia, Forst.; Seem., Fl. Vit., p. 263; Nadeaud, Enum. Pl. Tahiti, p. 42; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 123, 138, 147.

ADMIRALTY ISLANDS.—This is now generally diffused in warm regions, chiefly in maritime districts, and in Polynesia it extends eastward to the Marquesas and northward to the Mariannes, but it does not occur in the Sandwich Islands.

MONOCOTYLEDONES.

ORCHIDEÆ.

DENDROBIUM.

Dendrobium nitidissimum, Rchb. f.

Dendrobium nitidissimum, Rchb. f. in Journ. Linn. Soc. Lond., xv. p. 112.

Nova sectio *Diplocaulobium*. Rhizomatis repentis gemmæ aliæ pseudobulbos monophyllos sistentes, aliæ pedunculos basi vaginatos, apice floridos.

Pseudobulbis fusiformi-teretiusculis, siccis multiangulatis sulcatisque monophyllis, folio lineari-ligulato attenuato bilobulo; pedunculo a pseudobulbo foliato liberrimo ex alia gemma, nitido basi vaginato ancipiti, apice bractea magna chartacea nitida, superaddita bractea minore, fatua visa; flore solitario (semper?) valde membranaceo, mento bene evoluto, lobulato, sepalis elongatis acuminatis, tepalis angustioribus, labello sepalorum dimidium excedente a basi lineari extenso, medio trifido, laciniis lateralibus obtusangulis antice lobulatis, lacinia media late ligulate lobulata, carinis geminis a basi versus discum laciniæ mediæ, ibi melius crispato-lobulatis, antice in pilos numerosissimos tomentum densum efficientibus solutis, columnæ androclinio trifido, laciniis membranaceis.

Floris perigonium quasi rostriforme illi *Thrixspermi* cujusdam (*Arachnitis*, etc.) comparabile, ¾ pollicis longum, delicatissimum, tenuissimum. Plantula valde egregia dignitate gemmarum varia insignis. *Macrolepidi*, A. Rich. eo comparabilis, quod rhachis sub bractea incisa quodammodo articulata. Labellum *Macrolepidis* tamen exacte est illud *Bulbophyllosum*.

ADMIRALTY ISLANDS.—Endemic.

Dendrobium scopa, Lindl. var.

Dendrobium scopa, Lindl. var.; Rchb. f. in Walp. Ann., vi. p. 303.

ADMIRALTY ISLANDS.—Also in the Philippine Islands.

Agrostophyllum longifolium, Rchb. f.

Appendicula longifolia, Blume; Miq., Fl. Ind. Bat., iii. p. 704.

ADMIRALTY ISLANDS.—Also in the Kew Herbarium from Sumatra and Java. The genus comprises only about half-a-dozen species, which inhabit India and the Archipelago. Bentham and Hooker (Gen. Plant., iii. p. 517) suggest that *Agrostophyllum megalurum*, Rchb. f. (in Seem. Fl. Vit., p. 296) belongs to a different genus, so that this would be the only one known from Polynesia.

Thelasis triptera, Rchb. f.

Thelasis triptera, Rchb. f. in Bonplandia, 1855, p. 119.

ADMIRALTY ISLANDS.—Also from the Philippines. Of this genus about eight species are known, and they are restricted to the warmer parts of Asia.

Tropidia effusa, Rchb. f.

Tropidia effusa, Rchb. f. in Seem. Fl. Vit., p. 295.

ADMIRALTY ISLANDS.—Not known to us elsewhere except from the Fiji Islands. *Tropidia* is a genus of about half-a-dozen species inhabiting India, the Archipelago, and Polynesia.

Phreatia sp.

ADMIRALTY ISLANDS.—Specimen insufficient for specific determination. *Phreatia* is a small genus confined to the tropics of the Old World.

SCITAMINEÆ.

Clinogyne grandis, Benth.

Clinogyne grandis, Benth. et Hook. f., Gen. Plant., iii. p. 651.
Maranta grandis, Miq., Fl. Ind. Bat. Suppl., p. 616.

ADMIRALTY ISLANDS.—Malayan Peninsula and Archipelago, from the Philippines to the Arrou Islands.

AMARYLLIDEÆ.

Crinum asiaticum, Linn.

Crinum asiaticum, Linn.; Benth., Fl. Austr., vi. p. 454; Seem., Fl. Vit., p. 305; Miq., Fl. Ind. Bat., iii. p. 580; Baker, Fl. Maurit., p. 366; Moseley in Journ. Linn. Soc. Lond., xv. p. 76.

ADMIRALTY ISLANDS.—This conspicuous herbaceous, bulbous plant is common on the sandy sea-shores of Tropical Asia and Australia, extending in Polynesia to the Fiji, and perhaps also to the Tongan Islands. *Crinum* numbers about sixty species, spread over the

tropics of both hemispheres, many of them being littoral plants. *Crinum asiaticum* is naturalised in the Mauritius. By an oversight this is omitted in the enumeration of the plants from the South-eastern Moluccas, though, according to Moseley, it was abundant on the shores of the Arrou Islands.

TACCACEÆ.

Tacca pinnatifida, Forst.

Tacca pinnatifida, Forst., Char. Gen. Plant., p. 70, t. 35, et Pl. Escul. Ins. Oceani Austr., p. 59, *excl. syn.* Rumphii, *fide* Seem., Fl. Vit., p. 102; Benth., Fl. Austr., vi. p. 458; Nadeaud, Enum. Pl. Tahiti, p. 35; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 130 et 145; Mann in Proc. Amer. Acad., vii. p. 205.

ADMIRALTY ISLANDS.—Tropical Asia, Africa, and Australia, and common almost throughout Polynesia, where it grows both wild and cultivated. According to Seemann it is a common seashore plant in the Fijis. Jouan states that it is comparatively rare in the Marquesas, and he suspects that it is a colonist.

PALMÆ.

Cocos nucifera, Linn.

Cocos nucifera, Linn.; Seem., Fl. Vit., p. 275; Benth., Fl. Austr., vii. p. 143; Nadeaud, Enum. Pl. Tahiti, p. 40; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, pp. 127, 136, et 147; Mann in Proc. Amer. Acad., vii. p. 204.

ADMIRALTY ISLANDS.—Now very widely spread in tropical regions, especially in maritime districts. See remarks on p. 203. Mr Moseley (Journ. Linn. Soc. Lond., xv. p. 78) states that he saw altogether five species of palm in the Admiralty Islands; namely, the cocoa-nut, the sago, a species of *Areca*, a *Caryota*, and a small fan palm. No Rattan (*Calamus*) was seen growing, but rattan cables were used by the islanders. *Nipa* does not appear to reach these islands, but Dr Guppy has lately collected it in the Solomon Islands.

PANDANEÆ.

Pandanus spp., Moseley.

Pandanus spp., Moseley in Journ. Linn. Soc. Lond., xv. pp. 76 et 79.

ADMIRALTY ISLANDS.—The smallest fragment is usually sufficient to indicate the genus *Pandanus*, but the full material necessary to define the species is wanting in our botanical collections for a large number of them. Mr Moseley observed three species of *Pandanus* in the Admiralty Islands, and he collected specimens of two, one of them quite a miniature and probably undescribed. He further states (*loc. cit.*, p. 79), that the three species met with are identical with the three found in the Arrou Islands.

AROIDEÆ.

Pothos rumphii, Schott var. ?

Pothos rumphii, Schott var. ? DC., Monogr. Phanerog., ii. p. 89.
Scindapsus rumphii, Presl, Epim., p. 241 ; Miq., Fl. Ind. Bat., iii. p. 185.

ADMIRALTY ISLANDS.—The specimens of this aroid are excellent, but we have only seen a single imperfect specimen of *Pothos rumphii*, which is from Java. It is a more robust plant than the present, and the two may be distinct species.

Pothos sp.

ADMIRALTY ISLANDS.—Barren branches of an extremely slender species with small leaves. It belongs to the group having winged petioles as large as, or larger than the blade. The same species, in the same condition, was collected in New Guinea.

CYPERACEÆ.

Hypolytrum latifolium, Rich.

Hypolytrum latifolium, Rich. ; Benth., Fl. Austr., vii. p. 339 ; Seem., Fl. Vit., p. 317.

ADMIRALTY ISLANDS.—Widely dispersed in Tropical Asia and Africa; also occurring in North-eastern Australia, and in Polynesia it extends eastward to the Fiji Islands. A very closely allied species inhabits Tropical America.

Scleria sumatrensis, Retz ?

Scleria sumatrensis, Retz? Miq., Fl. Ind. Bat., iii. p. 343.

ADMIRALTY ISLANDS.—The specimen is very young, and may not belong to this species.

GRAMINEÆ.

Oplismenus compositus, Beauv.

Oplismenus compositus, Beauv.; Benth., Fl. Austr., vii. p. 491 ; Nadeaud, Enum. Pl. Tahiti, p. 31.
Orthopogon compositus, R. Br. ; Miq., Fl. Ind. Bat., iii. p. 443.

ADMIRALTY ISLANDS.—Generally spread in warm countries, including Polynesia, eastward to Pitcairn and the Sandwich Islands. Of this genus there are several other widely diffused species, the numerous forms of which are very difficult of classification.

Ischæmum muticum, Linn.

Ischæmum muticum, Linn. ; Benth., Fl. Austr., vii. p. 520.

ADMIRALTY ISLANDS.—Widely spread in Tropical Asia and Western Polynesia, and also found on the north-eastern coast of Australia. The genus is a considerable one, most of the species being Asiatic or African, though a few are found in America.

Centotheca lappacea, Desv.

Centotheca lappacea, Desv.; Benth., Fl. Austr., vii. p. 640; Seem., Fl. Vit., p. 322; Nadeaud, Enum. Pl. Tahiti, p. 32.
Poa latifolia, Forst., Fl. Ins. Austr. Prodr., p. 8.

ADMIRALTY ISLANDS.—A monotype spread nearly all over Tropical Asia, Africa, and Polynesia, and it has also been collected in North-eastern Australia.

GYMNOSPERMEÆ.

CYCADEÆ.

Cycas circinalis, Linn.

Cycas circinalis, Linn.; Seem., Fl. Vit., p. 268; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 147.

ADMIRALTY ISLANDS.—Tropical Asia, Africa, and Western Polynesia.

CRYPTOGAMÆ.—VASCULARES.

FILICES.

Cyathea moseleyi, Baker.

Cyathea moseleyi, Baker in Journ. Linn. Soc. Lond., xv. p. 104.

Frond ample, pinnate. Rachises brown, those of the pinnæ ciliated on the upper side, naked on the lower. Pinnæ oblong-lanceolate, 1½ feet by 5–6 inches. Pinnules sessile, ligulate-lanceolate, 2¼ to 3 inches long, ⅝ to ¾ inch broad, cut down to the rachis into subentire, blunt, slightly curved, tertiary segments which are 2 lines broad. Texture moderately firm. Upper surface naked; lower with many minute, deltoid, bullate scales on the midrib of the veins. Veins 8–10-jugate, ascending, distinct, all but the uppermost forked. Sori 8–10 to a segment, median, placed in a distinct space from both edge and midrib, and with a distinct space between each. Involucre large, membranous, persistent, with a regularly truncate margin.

ADMIRALTY ISLANDS.—Nearest the Fijian and Samoan *Cyathea propinqua*, Mett.

Hymenophyllum (Leptocionium) polyodon, Baker.

Hymenophyllum (Leptocionium) polyodon, Baker in Journ. Linn. Soc. Lond., xv. p. 105.

Rhizome wide-creeping, filiform, lanose. Stipes ¾ to 2 inches, filiform, flexuose, fibrillose. Lamina lanceolate, tri-pinnatifid, 2–3 inches long, ½ to 1 inch broad. Pinnæ 8–12-jugate, rhomboid or lanceolate-rhomboid, parallel with the rachis on the upper side at the base, cuneate-truncate on the lower side, the central ones the largest, ¼ inch broad at the middle, the lower ones reduced. Ultimate segments 10–15 to a pinna, ligulate, close, ½ to 1 line

long, bordered by regular, numerous, minute teeth. Sori one to each pinna, terminal on a side segment of the lowest anterior pinnule. Involucre turbinate, a line deep, the very base immersed in the lamina; valves toothed at the edge, free nearly to the base; receptacle exserted.

ADMIRALTY ISLANDS. — Intermediate between *Hymenophyllum tunbridgense* and *Hymenophyllum multifidum*.

Trichomanes motleyi, Van den Bosch.

Trichomanes motleyi, Van den Bosch; Hook. and Bak., Synopsis Fil., p. 73; Baker in Journ. Linn. Soc. Lond., xv. p. 105.

ADMIRALTY ISLANDS.—This species is found in Ceylon, Moulmein, the Andamans, Borneo, and New Caledonia, and Mr Baker informs us that *Hymenophyllum cognatum*, Cesati, from New Guinea, is typical *Hymenophyllum motleyi*, and *Hymenophyllum pannosum*, Cesati, from the same country, is a large variety.

Trichomanes peltatum, Baker.

Trichomanes peltatum, Baker in Journ. Linn. Soc. Lond., ix. p. 336, t. 8, et xv., p. 105; Hook. and Bak., Synopsis Fil., p. 73; Benth., Fl. Austr., vii. p. 701.

ADMIRALTY ISLANDS.—This remarkable fern was first discovered in Samoa and subsequently in New Caledonia and Queensland.

Trichomanes humile, Forst.

Trichomanes humile, Forst.; Baker in Journ. Linn. Soc. Lond., xv. p. 105; Hook. and Bak., Synopsis Fil., p. 80.

Trichomanes erectum, Brackenr. in Bot. U.S. Expl. Exped., i. p. 250, t. 36; Seem., Fl. Vit., p. 343.

ADMIRALTY ISLANDS.—This species ranges from New Zealand through Polynesia to the Sandwich Islands and the Philippines and Java, but it is not recorded from Australia. It is, however, very closely allied to the widely spread *Hymenophyllum pyxidiferum*.

Trichomanes filicula, Bory.

Trichomanes filicula, Bory; Baker in Journ. Linn. Soc. Lond., xv. p. 105; Hook. and Bak., Synopsis Fil., p. 81; Seem., Fl. Vit., p. 344.

ADMIRALTY ISLANDS.—Very common and widely dispersed in Tropical and Subtropical Asia and Africa, and extending in Polynesia eastward to Tahiti. It is also found in New Caledonia and New Guinea, though hitherto not in Australia.

Trichomanes javanicum, Blume.

Trichomanes javanicum, Blume; Baker in Journ. Linn. Soc. Lond., xv. p. 105; Hook. and Bak., Synopsis Fil., p. 83; Benth., Fl. Austr., vii. p. 702.

ADMIRALTY ISLANDS.—North-eastern Australia, and Samoa northwards, through the

Archipelago to the Himalayas, and westward to Madagascar. There are also specimens in the Kew Herbarium from the Solomon Islands and the New Hebrides, but not from the Fijis.

Davallia elegans, Swartz.

Davallia elegans, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 106; Benth., Fl. Austr., vii. p. 715.

ADMIRALTY ISLANDS.—Widely diffused in Tropical Asia, Africa, Australia, and Polynesia, where it extends eastward to Harvey Island and Tahiti.

Lindsaya lobata, Poir.

Lindsaya lobata, Poir.; Baker in Journ. Linn. Soc. Lond., xv. p. 106; Hook. and Bak., Synopsis Fil., p. 111; Benth., Fl. Austr., vii. p. 720.

ADMIRALTY ISLANDS.—North-eastern Australia to Samoa and the Fijis, and the Malayan Archipelago to Southern India. Baker unites *Lindsaya billardieri*, *Lindsaya pulchra*, *Lindsaya harveyi*, and *Lindsaya seemanni*, Carruthers (Seem., Fl. Vit., pp. 337 et 338) with this.

Asplenium nidus, Linn.

Asplenium nidus, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 106; Benth., Fl. Austr., vii. p. 744; Seem., Fl. Vit., p. 353.

ADMIRALTY ISLANDS.—Very widely spread in the warmer parts of the Old World, and in Polynesia ranging from New Caledonia to Mangaia, Tahiti, Elisabeth Island, and the Sandwich Islands. It inhabits the islands of the Indian Ocean, including Madagascar, Johanna, the Seychelles, and Diego Garcia, Chagos Archipelago, but not Continental Africa.

Asplenium falcatum, Lam.

Asplenium falcatum, Lam.; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Benth., Fl. Austr., vii. p. 746; Seem., Fl. Vit., p. 354.

ADMIRALTY ISLANDS.—This species ranges from New Zealand to India and Africa, and in Polynesia it extends to the Fijis, Samoa, and Tongatabu. Recently, too, Mr Jenman has sent a specimen of a fern from Jamaica, which is not distinguishable from this.

Asplenium cuneatum, Lam.

Asplenium cuneatum, Lam.; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Hook. and Bak., Synopsis Fil., p. 214; Seem., Fl. Vit., p. 355.

ADMIRALTY ISLANDS.—A common Tropical American species, also found in South and Tropical Africa, the Mascarene Islands, Hong Kong, Java, and other parts of the Malayan Archipelago; the other Polynesian localities represented in the Kew Herbarium are the Fijis and the Sandwich Islands.

Asplenium (Diplazium) brackenridgei, Baker.

Asplenium (Diplazium) brackenridgei, Baker in Hook and Bak. Synopsis Fil., p. 234, et in Journ. Linn. Soc. Lond., xv. p. 107.
Diplazium tenerum, Presl; Seem., Fl. Vit., p. 356.

ADMIRALTY ISLANDS.—This is also represented in the Kew Herbarium from the Samoan, Fiji, Solomon, and Philippine Islands.

Asplenium (Anisogonium) esculentum, Presl.

Asplenium (Anisogonium) esculentum, Presl; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Hook. and Bak., Synopsis Fil., p. 244.
Asplenium (Diplazium) vitiense, Baker; Seem., Fl. Vit., p. 357.

ADMIRALTY ISLANDS.—North-east Australia to Formosa, China, and the Himalayas, and eastward in Polynesia to the Fijis and Samoa. This species is not included in Bentham's Flora Australiensis, but a specimen in the Kew Herbarium, from Rockingham Bay, named *Asplenium polypodioides* by Mueller, is it, Mr Baker tells us.

Nephrodium molle, Desv.

Nephrodium molle, Desv.; Baker in Journ. Linn. Soc. Lond., xv. p. 107; Benth., Fl. Austr., vii. p. 756 (*sub Aspidio*).
Nephrodium nymphale, Carruthers in Seem. Fl. Vit., p. 363.

ADMIRALTY ISLANDS.—One of the most generally diffused ferns in tropical and sub-tropical regions.

Nephrodium truncatum, Presl.

Nephrodium truncatum, Presl; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Benth., Fl. Austr., vii. p. 756; Seem., Fl. Vit., p. 363.

ADMIRALTY ISLANDS.—North-eastern Australia to the Philippines and the Himalayas; the Mascarene and Comoro Islands, and very common in Polynesia, from New Caledonia to the Fiji, Society, and Sandwich Islands.

Nephrolepis acuta, Presl.

Nephrolepis acuta, Presl; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Seem., Fl. Vit., p. 361.

ADMIRALTY ISLANDS.—A very widely spread species, common in Polynesia, from New Caledonia to Maingaia, the Society, and the Pelew Islands. Although not included in the Flora Australiensis, there are numerous Australian specimens in the Kew Herbarium bearing this name.

Nephrolepis exaltata, Schott.

Nephrolepis exaltata, Schott; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Benth., Fl. Austr., vii. p. 754.

ADMIRALTY ISLANDS.—Generally diffused in most warm countries; in Polynesia it ranges from New Caledonia to the Society, Ellice, and Sandwich groups.

Polypodium (Eupolypodium) decorum, Brack.

Polypodium (*Eupolypodium*) *decorum*, Brack.; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Hook. and Bak., Synopsis Fil., p. 331.

ADMIRALTY ISLANDS.—Ceylon, Malayan Peninsula and Archipelago, and in Polynesia eastward through the Fijis and Samoan Islands to Tahiti, and northward to the Sandwich group.

Polypodium (Niphobolus) adnascens, Swartz.

Polypodium (*Niphobolus*) *adnascens*, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 108; Seem., Fl. Vit., p. 367 (*sub Niphobolo*).

ADMIRALTY ISLANDS.—Spread nearly all over the warmer parts of Asia; also occurring in Western Tropical Africa; and in Polynesia it extends eastward through the Fijis to the Society Islands.

Polypodium (Phymatodes) irioides, Poir.

Polypodium (*Phymatodes*) *irioides*, Poir.; Baker in Journ. Linn. Soc. Lond., xv. p. 109; Benth., Fl. Austr., vii. p. 771.
Pleopeltis irioides, T. Moore; Seem., Fl. Vit., p. 367.

ADMIRALTY ISLANDS.—North-eastern Australia to Chusan and North India, the Mascarene Islands, and West Africa; in Polynesia it ranges from New Caledonia to the Fijis and Tahiti.

Polypodium (Phymatodes) linguæforme, Mett.

Polypodium (*Phymatodes*) *linguæforme*, Mett.; Baker in Journ. Linn. Soc. Lond., xv. p. 109; Hook. and Bak., Synopsis Fil., p. 358.

ADMIRALTY ISLANDS.—Also from Amboina, New Guinea, the Solomon and Fiji Islands.

Polypodium (Phymatodes) rampans, Baker.

Polypodium (*Phymatodes*) *rampans*, Baker in Journ. Linn. Soc. Lond., xv. p. 109.

Rhizome very wide-creeping, $\frac{1}{2}$ line thick, clothed only with a few minute, adpressed, linear, dark-brown scales. Stipes naked, very short. Lamina simple, lanceolate-ligulate, 4–6 inches long, $\frac{3}{4}$ to $1\frac{1}{4}$ broad at the middle, acute, narrowed gradually to the ends, membranous, both surfaces quite naked. Main veins erecto-patent two-thirds of the way to the edge, then uniting in an arch; areolæ rather large, very distinct, each with an included knobbed free veinlet. Sori not present.

ADMIRALTY ISLANDS.—A next neighbour to *Polypodium lycopodioides*.

Polypodium phymatodes, Linn.

Polypodium phymatodes, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 110; Benth., Fl. Austr., vii. p. 769.
Pleopeltis phymatodes, T. Moore; Seem., Fl. Vit., p. 368.

Admiralty Islands.—Widely spread in the tropics of the Old World, and ranging in Polynesia from New Caledonia to the Fijis and Tahiti.

Polypodium (Phymatodes) nigrescens, Blume.

Polypodium (Phymatodes) nigrescens, Blume; Baker in Journ. Linn. Soc. Lond., xv. p. 110; Benth., Fl. Austr., vii. p. 769.

Admiralty Islands.—North-eastern Australia to the Malayan Peninsula and the Philippines, and eastward in Polynesia to the Fijis and Samoa and Savage Islands, in the Navigators' group.

Vittaria elongata, Swartz.

Vittaria elongata, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 718.
Vittaria rigida, Kaulf.; Seem., Fl. Vit., p. 372.

Admiralty Islands.—Eastern Australia to the Himalayas, Mascarene Islands, the warmer parts of Africa; and throughout Polynesia from New Caledonia to Tahiti, the Sandwich and Marianne Islands.

Acrostichum (Stenochlæna) scandens, J. Sm.

Acrostichum (Stenochlæna) scandens, J. Sm.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 778; Seem., Fl. Vit., p. 373.

Admiralty Islands.—North-eastern Australia to the Himalayas, and eastward in Polynesia to the Fijis and Samoa.

Acrostichum (Gymnopteris) repandum, Blume.

Acrostichum (Gymnopteris) repandum, Blume, var. *quoyanum*, Gaud.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 779.

Admiralty Islands.—North-eastern Australia to China and the Philippines, Mascarene Islands, and in Polynesia eastward to the Fijis and Samoa, and southward to New Caledonia.

Acrostichum (Photinopteris) thomsoni, Baker.

Acrostichum (Photinopteris) thomsoni, Baker in Journ. Linn. Soc. Lond., xv. p. 111.

Fronds subsessile, membranous, glabrous, the barren part lanceolate, 2–3 feet long, 6–8 inches broad, cut down to a broad wing into lanceolate or deltoid lobes; those of the

centre of the frond 2–3 inches deep, 1½–2 inches broad at the base, erecto-patent, narrowed gradually to an acute point; those near the base more shallow. Pinnæ each with a distinct costa and erecto-patent main veins 3–4 lines apart, distinct to the edge, connected by several distinct cross-bars, as in *Campyloneuron*; the final areolæ quadrate, minute, furnished with copious, knobbed, free, included venules. Fertile portion of the frond extending over the upper half-foot of the rachis, which bears about twenty pairs of subulate lomarioid pinnæ 1½ – 2 inches long. Rachis brown-stramineous. Both surfaces quite destitute of hairs and scales.

ADMIRALTY ISLANDS.—Of known species only near *Acrostichum drynarioides*, from which it differs in its membranous texture and much smaller size.

Lygodium dichotomum, Swartz.

Lygodium dichotomum, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Hook. and Bak., Synopsis Fil., p. 437.

ADMIRALTY ISLANDS.—Throughout the Malayan Archipelago, South India, and South China; and besides the Admiralty Island specimens there is another in the Kew Herbarium from Polynesia, but without any more definite locality.

Ophioglossum pendulum, Linn.

Ophioglossum pendulum, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 689; Seem., Fl. Vit., p. 378.

ADMIRALTY ISLANDS.—Eastern Australia to the Philippines, Assam, Ceylon, and the Mascarene Islands, and eastward in Polynesia to Tahiti and the Sandwich Islands.

LYCOPODIACEÆ.

Lycopodium cernuum, Linn.

Lycopodium cernuum, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 111; Benth., Fl. Austr., vii. p. 676; Seem., Fl. Vit., p. 328.

ADMIRALTY ISLANDS.—This is spread nearly all over the tropics, both in America and in the Old World, including New Zealand and Polynesia, from the New Hebrides to Tahiti and the Sandwich and Marianne groups. It also occurs in the Azores.

Selaginella canaliculata, Baker.

Selaginella canaliculata, Baker in Journ. Bot., 1885, p. 21.
Selaginella inæqualifolia, Baker in Journ. Linn. Soc. Lond., xv. p. 112, *non* Spring, *fide* Bakeri.

ADMIRALTY ISLANDS.—Generally dispersed in Tropical Asia, including Western Polynesia.

Psilotum triquetrum, Linn.

Psilotum triquetrum, Linn.; Baker in Journ. Linn. Soc. Lond., xv. p. 112; Benth., Fl. Austr., vii. p. 681; Seem., Fl. Vit., p. 331.

ADMIRALTY ISLANDS.—Spread over nearly all tropical and subtropical regions, including the most remote islands of Polynesia.

Psilotum complanatum, Swartz.

Psilotum complanatum, Swartz; Baker in Journ. Linn. Soc. Lond., xv. p. 112; Benth., Fl. Austr., vii. p. 685.
Psilotum flaccidum, Wall.; Seem., Fl. Vit., p. 330.

ADMIRALTY ISLANDS.—This species is as generally diffused in Polynesia as *Psilotum triquetrum*, and nearly as widely in other parts of the world, except that it does not appear to reach Africa, though common in the Mascarene Islands.

CRYPTOGAMÆ.—CELLULA ES.

MUSCI.[1]

Octoblepharum (Arthrocormus) schimperi, Mitt.

Arthrocormus schimperi, Dozy et Molk., Musc. Frond. Arch. Ind., p. 76, t. 27, et Bryol. Jav., p. 25.

ADMIRALTY ISLANDS.—Fine specimens, though barren. Amboina to Borneo and the Philippines.

Octoblepharum (Arthrocormus) incrassatum, Mitt.

Octoblepharum (*Arthrocormus*) *incrassatum*, Mitt. in Seem. Fl. Vit., p. 386, t. 98, fig. g.

ADMIRALTY ISLANDS.—Barren; its fruit is as yet unknown. Described from Samoan specimens.

All the species of this group, and about ten are certainly known to belong to it, have the leaves more or less distinctly tristichous in their insertion, and are composed almost entirely of an incrassated trigonous nerve, thus differing from the structure of the leaf in the typical *Octoblepharum albidum*, where the incrassated nerve is flattened; and there is no trace in the upper portion of the pagina of the leaf of a marginal limb, which is more or less evident among the species allied to *Octoblepharum schimperi*, as well as to those agreeing with *Octoblepharum densifolium* and *Octoblepharum squarrosum* (*Leucophanes*), Brid. Bryol. Univ., i. p. 764 = *Syrrhopodon candidus*, Schwägr., t. 183 = *Leucophanes reinwardtianum*, C. Müll., Synopsis Musc. Frond., i. p. 82, Dozy et Molk., Bryol. Jav., t. 16, which have the dilated nerve so thin that its small medial carina is easily

[1] By William Mitten, A.L.S.

mistaken for the nerve itself; the true pagina of the leaf, as in the *Leucobryæ*, being in all these mosses distinguishable for the most part only at the base.

The genus *Leucophanes* was founded by Bridel on *Leucophanes octoblepharoides*, *Leucophanes squarrosum*, and *Leucophanes fragile*; its essential character being the sixteen teeth of the peristome, which distinguished it from *Octoblepharum* as then known. Now, however, with species closely resembling *Octoblepharum albidum*, except in having sixteen teeth in their peristome, it is evident that the eight teeth in *Octoblepharum albidum* are but coherent pairs of the normal number of peristomial teeth, analogous instances of which occur in *Orthotrichum*, and therefore any distinction on this character is of small value.

Octoblepharum (Leucophanes) octoblepharoides, Mitt.

Leucophanes octoblepharoides, Brid., Bryol. Univ., i. p. 763; C. Müll., Synopsis Musc. Frond., i. p. 82.

Admiralty Islands.—Small barren stems, scattered among other mosses. India, and throughout the Malayan Archipelago.

Octoblepharum (Leucophanes) densifolium, Mitt.

Octoblepharum (Leucophanes) densifolium, Mitt. in Bonplandia, 1861, p. 366.

Admiralty Islands.—Also found in the Fijis.

Growing in large tufts on trees overhanging the sea. Similar to *Octoblepharum squarrosum* in size, but the foliage is not divaricate.

Octoblepharum (Leucophanes) smaragdinum, Mitt.

Octoblepharum (Leucophanes) smaragdinum, Mitt. in Bonplandia, 1861, p. 366.

Admiralty Islands.

The fruit of this is not yet known; the species is found in the Samoan, Solomon, and Fiji Islands, in the Ellice group, in Palmerston Island, and also in the Philippines. The description of *Leucophanes albescens*, C. Müll. in Bot. Zeit., 1864, p. 347, appears to indicate another similar or perhaps the same species; but its particularly distinctive character as given—Folia siccitate crispatula nervo validissimo oculis nudis nitore jam distincto robusta—scarcely agrees with a moss with foliage, very slightly or not at all contorted, each leaf being straight in direction, but twisted and with the carina prominent, the whole upper portion being only of two strata of cells.

This is not enumerated by C. Müller in his list of the Samoan and Vitian species, but he describes three others, which brings up his number to the same as that included in the Flora Vitiensis, and he divides the species in the following manner, considering all the species, with the exception of *Arthrocormus dentatus*, as a species of *Leucophanes*:—*Trachynotus*, containing *Octoblepharum asperum* and *Octoblepharum scabrum*; *Leionotus*, con-

taining *Octoblepharum recurvum* and *Octoblepharum tetensi*, and *Tropinotus*, containing *Octoblepharum albovirens*, and *Octoblepharum vitianum*.

The section *Trachynotus*, composed as above, is therefore not different from *Arthrocormus;* and *Leionotus* is exactly the original *Leucophanes*. The group is placed between Sphagnaceæ and Fissidenteæ, and is thus isolated. When more is known respecting the species hitherto seen only barren, it may be found that their nearest affinity is with *Syrrhopodon*, from which it is even now not very easy to distinguish some species allied to *Syrrhopodon tristichus*.

Syrrhopodon (Orthotheca) croceus, Mitt.

Syrrhopodon (Orthotheca) croceus, Mitt. in Journ. Linn. Soc. Lond., iii. Suppl. p. 41.

Admiralty Islands.—A form having short stems, bearing a few old capsules.

Occasionally specimens of this are found nearly four inches high; it appears to be widely spread in the Pacific, and is found in Ceylon. Müller, not having seen the fruit nor calyptra of this moss, has placed it in *Calymperes*.

Syrrhopodon (Eusyrrhopodon) albovaginatus, Schwägr.

Syrrhopodon (Eusyrrhopodon) albovaginatus, Schwägr., Suppl., t. 131; C. Müll., Synopsis Musc. Frond., i. p. 541.

Admiralty Islands.—Specimens bearing very young fruit. Also in the Isle of Pines, Fiji, Samoa, &c.

This well-marked species is easily recognised by its leaves being divergent with a considerable interval between them, a character but little altered when they are dry. The *Syrrhopodon græffeanus*, C. Müll. in Journ. Mus. Godef., is *Syrrhopodon lævigatus*, Mitt., in Seem. Fl. Vit., p. 389.

Syrrhopodon (Eusyrrhopodon) ciliatus, Schwägr.

Syrrhopodon (Eusyrrhopodon) ciliatus, Schwägr., Suppl., t. 130; C. Müll., Synopsis Musc. Frond., i. p. 544.
Weisia ciliata, Hook., Musc. Exot., t. 171.

Admiralty Islands.—In very small quantity, but bearing fruit. It also inhabits various islands of the Malayan Archipelago.

Calymperes dozyanum, Mitt.

Calymperes dozyanum, Mitt. in Journ. Linn. Soc. Lond., iii. Suppl. p. 42.
Calymperes moluccense, Dozy et Molk., Bryol. Jav., i. p. 47, t. 37, *non* Schwägr.

Admiralty Islands.—A well-fruited specimen.

This species is found also in Samoa, Java, the Philippines, and Ceylon. It is very different from *Calymperes moluccense* in its more spathulate leaves, not dilated above the

base, and in the entire absence of the limbation which is always present in that species. C. Müller considers the Samoan specimens distinct, and has described them as *Calymperes obliquatum*. He did not see the complete state in fruit, but relies on the nerve being shining, a character not obvious in the specimens collected by the Rev. T. Powell. The same author, too, not having seen the fruit of *Calymperes taitense* (*Syrrhopodon*, Sull.), has no hesitation in returning it to the *Orthotheca* section of *Syrrhopodon*; yet its fruit proves it to be a true *Calymperes*.

Neckera gracilenta, Van den Bosch et Lac.

Neckera gracilenta, Van den Bosch et Lac.; Dozy et Molk., Bryol. Jav., ii. p. 62, t. 182.

ADMIRALTY ISLANDS.—Small barren specimens.

This moss, of which all the specimens are without fruit, appears to belong to that group of species which agree in fructification with *Neckera disticha*; but until complete specimens are found, its exact position must be doubtful. Closely similar specimens both in size and colour come from Java, Borneo, and the Pacific Islands.

Sematophyllum (Rhaphidorrhynchum) cirrhifolium, Mitt.

Hypnum cirrhifolium, Schwägr. in Freycinet Voy. Bot., i. p. 129; C. Müll., Synopsis Musc. Frond., ii. p. 281.
Leskea cirrhifolia, Schwägr., Suppl., t. 290.

ADMIRALTY ISLANDS.—A few fragments only, agreeing with Gaudichaud's specimens collected in the Moluccas.

Ectropothecium inflectens, Mitt.

Hypnum inflectens, C. Müll., Synopsis Musc. Frond., ii. p. 239.
Ectropothecium fuscescens, Mitt. in Journ. Linn. Soc. Lond., x. p. 180.
Hypnum fuscescens, Hook. et Arn., Bot. Beech. Voy., p. 76, t. 19.

ADMIRALTY ISLANDS.—In a barren state. Australia and Polynesia.

C. Müller (in Journ. Mus. Godef.) enumerates this species as *Hypnum* (*Vesicularia*) *inflectens*, Brid., and this is probably a correct reference to Bridel's *Leskea* (*Omalia*) *inflectens*, Bryol. Univ., ii. p. 331, but the *Hypnum inflectens*, Brid., *loc. cit.*, p. 449, came from Hispaniola, and is doubtless quite distinct.

This species varies greatly in appearance, and, like its near allies, is uncertain in its expansion after being dried.

Pelekium velatum, Mitt.

Pelekium velatum, Mitt. in Journ. Linn. Soc. Lond., x. p. 176, et in Seem. Fl. Vit., p. 400.
Lorentzia longirostris, Hampe in Nuov. Giorn. Bot. Ital., iv. p. 288.

ADMIRALTY ISLANDS.—Small specimens on rotten wood. Borneo and Samoa.

In favourable conditions this forms very extensive patches, and in the absence of fruit it exactly resembles the smaller species of *Thuidium*.

Thuidium plumulosum, Mitt.

Hypnum plumulosum, Dozy et Molk. in Ann. Sci. Nat., 1844, p. 308; C. Müll., Synopsis Musc. Frond., ii. p. 486.

ADMIRALTY ISLANDS.—Barren stems. Widely diffused in the Malayan Archipelago.

A very elegant moss, in its dicœcious inflorescence and general appearance most similar to the section of the genus containing the larger species; but its seta is rough, a character otherwise confined to the section containing the smaller and monœcious forms.

HEPATICÆ.[1]

Plagiochila longispica, Mitt.

Plagiochila longispica, Mitt. in Seem. Fl. Vit., p. 407.

ADMIRALTY ISLANDS.—Elsewhere only from Samoa.

The specimens entirely agree with those from Samoa, with the exception of one tuft of male stems, on which the apices of the saccate leaflets enclosing the antheridia are slightly toothed; all the other specimens, like those from Samoa, have this portion entire. The spikelets of the male inflorescence vary from one or two to three, and these are simple and much elongated (2 cm.), or they are dichotomous and even trichotomous, with the divisions divaricate, and disposed in fan-shaped order. Unlike the Samoan *Plagiochila auriculata*, Mitt., *loc. cit.*, p. 408, which is closely allied to *Plagiochila blepharophora*, Nees ab E., and *Plagiochila bantamensis*, *ejusd.* Syn. Hep., p. 39, *Plagiochila longispica* in its habit and appearance is much more like the West Indian *Plagiochila macrostachya*, yet in stature it is much smaller, and it is a true member of the small section with cucullate ventral angles to the leaves.

Chiloscyphus coalitus, Nees.

Chiloscyphus coalitus, Nees in G. L. et N. Synopsis Hepat., p. 180; Mitt. in Seem. Fl. Vit., p. 409. *Jungermannia coalita*, Hook., Musc. Exot., t. 123.

ADMIRALTY ISLANDS.

In a barren state; fertile specimens are uncommon, and it is quite impossible to be sure that some specimens referred to this species on account of their leaves being combined in the same manner with the amphigastrium are truly identical, or if they are species of *Lophocolea* with the same arrangement, the similarity being very close in size and form.

[1] By William Mitten, A.L.S.

Bryopteris fruticosa, Lindb. et Gottsche.

Bryopteris fruticosa, Lindb. et Gottsche in G. L. et N. Synopsis Hepat., p. 737.
Bryopteris vittata, Mitt. in Seem. Fl. Vit., p. 411.

ADMIRALTY ISLANDS.

Very large, with many elegant fronds, and with a few perfect perianths. The band of enlarged cells in the middle of the leaf renders this species easily distinguishable from *Bryopteris sinclairii*, which is in other respects very similar, and these species in their perianths with three principal carinæ correspond to the South American *Bryopteris filicina*; but in both *Bryopteris fruticosa* and *Bryopteris sinclairii* the lateral branches are much shorter, so that the outline of the frond-like principal branches is always narrower. That group of species of which *Ptychanthus striatus* is the type differs in no other respect from *Bryopteris* except in the more numerous folds of the perianth, and in this particular is analogous to those *Frullaniæ* which have multiplicate perianths, but which on this account have not been separated from that genus.

Lejeunia sordida, Nees.

Lejeunia sordida, Nees in G. L. et N. Synopsis Hepat., p. 367, β.

ADMIRALTY ISLANDS.—The typical plant inhabits Java, the Philippines, and the var. β is also found in the Marianne Islands.

The perianth is elongate cylindraceous below, above the middle equally five plicate, the apex obtuse; the involucral leaves similar to the cauline.

Frullania gaudichaudi, Nees et Mont.

Frullania gaudichaudi, Nees et Mont.; G. L. et N., Synopsis Hepat., p. 435.

ADMIRALTY ISLANDS.—Specimens bearing young perianths. This is recorded in the Synopsis from Brazil, Tasmania, and Guam in the Marianne group.

A large species with the small lobule erect, close to the stem, and so placed as to appear above the base of the ventral margin. Its inflorescence is probably dicœcious.

Frullania secundiflora, Mont.

Frullania secundiflora, Mont., Syllog. Gen. et Sp. Crypt., p. 85; G. L. et N., Synopsis Hepat., p. 433.

ADMIRALTY ISLANDS.—Also from the Philippines.

In this the lobule is small, obovate, and is so much deflexed as to appear pendulous from the margin of the leaf. The inflorescence is monœcious.

LICHENES.[1]

Collema (Dichodium) byrsinum, Acharius.

Collema (*Dichodium*) *byrsinum*, Acharius; Nyl., Synopsis Meth. Lich., i. p. 113; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Admiralty Islands.—On trees; well fruited. Spread almost all over the tropics, especially in maritime districts.

Ramalina subfraxinea, Nyl.

Ramalina subfraxinea, Nyl., Recog. Monogr. Ramal., p. 41; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Admiralty Islands.—On branches; fertile. (Spores 0·015–0·018 millim. long, 0·004–0·005 millim. thick.) Nylander records this species from New Grenada, Mauritius, Bourbon, and the Marianne Islands, but he adds that it is perhaps not specifically different from the very widely dispersed *Ramalina fraxinea*.

Pyxine sp.? Crombie.

Pyxine sp.? Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Admiralty Islands.—On bark; sterile and indeterminable.

Lecanora granifera, var. leucotropa, Nyl.

Lecanora granifera, var. *leucotropa*, Nyl., Lich. Antill. Husn., p. 11; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

(Thallus K +, yellow; spores, 0·014–0·016 millim. long, 0·007–0·010 millim. thick.)

Admiralty Islands.—On the bark of trees; a small specimen.

Opegrapha subvulgata, Nyl.

Opegrapha subvulgata, Nyl. in Flora, 1869, p. 71; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226, *forma absita*.

Differt apotheciis interdum cæsio suffusis, sporis nonnihil turgidioribus (longit. 0·023–0·032 millim., crassit. 0·006 millim., 7-septatulis). Thallus variat maculiformis pallescens aut fuscescens. Spermogonia non visa.

Admiralty Islands.—On branches, apparently frequent.

Allied to *Opegrapha vulgata*, Acharius, a common British species widely diffused in other parts of the world.

[1] Extracted from the *Journ. Linn. Soc. Lond.*, vol. xvi., 1878, with additional references and remarks on the distribution of the species.

Arthonia polymorphoides, Nyl.

Arthonia polymorphoides, Nyl. in Journ. Linn. Soc. Lond., xvi. p. 216; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Arthonia interveniens, Stirton in Journ. Linn. Soc. Lond., xiv. p. 372, non Nyl.

ADMIRALTY ISLANDS.—On thin bark of trees: sparingly gathered. (Spores 0·016–0·022 millim. long, 0·006–0·007 millim. thick.)

This species was founded on Bermudan specimens collected by Mr Moseley, and these two distant localities are the only ones hitherto recorded for it.

Platygrapha stenogramma, Nyl.

Platygrapha stenogramma, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Thallus albidus subopacus tenuis lævis, tenuiter nigro limitatus; apothecia nigra lineari-elongata (latit. circiter 0·15 millim., longit. sæpius 1–2 millim.), simplicia, plus minusve flexuosa, intus albida; sporæ 8-næ aciculari-fusiformes 7–9 septatæ, longit. 0·030–0·035 millim., crassit. 0·004 millim., paraphyses irregulares graciles, hypothecium incolor. Iodo gelatina hymenialis dilute vinose rubescens.

Species apotheciis elongatis thallino-obductis (epithecio solo nudo) bene distincta, facie fere *Graphidis pavonianæ*. Spermatia arcuata, longit. 0·018–0·023 millim., crassit. 0·0005 millim.

ADMIRALTY ISLANDS.—On the bark of trees; probably not uncommon.

Graphis scripta, Acharius.

Graphis scripta, Acharius; Crombie in Journ. Linn. Soc. Lond., xvi. p. 226 (*forma pulverulenta*).

ADMIRALTY ISLANDS.—On the bark of trees; sufficiently typical.

This common British lichen is spread nearly all over the world.

Graphis dendrogramma, Nyl.

Graphis dendrogramma, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 226.

Affinis *Graphidi scriptæ*, sed apothecia cæsio-pruinosa longiora dendroideo-divisa, thallodeo-marginata; sporæ 8–10 loculares, longit. 0·020–0·030 millim., crassit. 0·006–0·007 millim.

ADMIRALTY ISLANDS.—On the bark of trees; very sparingly gathered.

Verrucaria paramera, Nyl.

Verrucaria paramera, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 227.

Thallus macula luteo-pallescente indicatus; apothecia pyrenio integre nigro, parte dimidia superiore nuda convexa prominula (latit. 0·5–0·7 millim.); sporæ 8-næ, fuscæ vel fuscescentes, ellipsoideæ vel oblongo-ellipsoideæ, 6-loculares vel demum loculis quibusdam

divisis (ita duplicatis), longit. 0·024–0·034 millim., crassit. 0·010–0·015 millim. Iodo gelatina hymenialis dilute vinose rosello tincta.

Accedit versus *Verrucariam libricolam*, sed sporæ minores et simpliciores.

ADMIRALTY ISLANDS.—On the bark of trees; very sparingly gathered.

Verrucaria albescens, Nyl., var. *subochracea*.

Verrucaria albescens, Nyl., var. *subochracea*, Nyl. ex Crombie in Journ. Linn. Soc. Lond., xvi. p. 227.

Differt præcipue thallo subochracea tincto; sporæ incolores vel subincolores, seriebus 4 bi- v. triloculosis, longit. 0·012–0·016 millim., crassit. 0·008–0·009 millim. Iodo gelatina hymenialis non reagens.

ADMIRALTY ISLANDS.—On thin bark; apparently frequent.

FUNGI.[1]

Agaricus (Pleurotus) scabriusculus, Berkl.

Agaricus (Pleurotus) scabriusculus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 48.

Conchiformis postice depressus, pileo subtiliter pulverulento-tomentoso demum leviter radiato-plicato; stipite brevissimo laterali cylindrico quandoque applanato; lamellis decurrentibus nec postice porosis integris.

Pileus 1–2 inches wide, an inch or more long, soft and pliant; when dry of an ochreaceous tint.

ADMIRALTY ISLANDS.—This species was founded on Mr Moseley's Admiralty Island specimen, but it has also been discovered in Australia.

Agaricus (Pleurotus) lachnocephalus, Berkl.

Agaricus (Pleurotus) lachnocephalus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 48.

Pileo excentrico tenui campanulato subtiliter velutino saccharino rufo umbilicato sulcato; stipite cylindrico pulverulento e basi orbiculari albo oriundo; lamellis latiusculis decurrentibus.

About ⅓ inch across; stem ¼ inch high, not 1 line thick.

ADMIRALTY ISLANDS.—Endemic as far as at present known.

Agaricus (Pleurotus) semisupinus, Berkl. et Broome.

Agaricus (Pleurotus) semisupinus, Berkl. et Broome in Journ. Linn. Soc. Lond., xi. p. 529; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—Ceylon; Borneo; Mauritius; Australia; Tasmania.

[1] We are indebted to Dr M. C. Cooke for the particulars of the distribution of the species, and likewise for the correction of a few inaccuracies which had crept into Mr Berkeley's original enumeration in the *Journ. Linn. Soc. Lond.*, vol. xvi. 1878.

Marasmius fulviceps, Berkl.

Marasmius fulviceps, Berkl. in Hook. Lond. Journ. Bot., 1847, p. 490; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—United States, Guiana, and Brazil, and also in Ceylon.

Marasmius hispidulus, Berkl.

Marasmius hispidulus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Pileo e convexo explanato fulvo hispido; stipite gracili deorsum albo furfuraceo, sursum primitus subtiliter velutino brunneo; lamellis ventricosis adnatis.

Pileus 2–3 lines across; stems $\frac{1}{3}$ to $\frac{1}{2}$ inch high.

ADMIRALTY ISLANDS.—Endemic.

There is also in the collection a barren *Marasmius* on *Trichomanes javanicus*.

Lentinus hygrometricus, Berkl.

Lentinus hygrometricus, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Pileo infundibuliformi, subtiliter tomentoso lineato, margine exsiccato lobato inflexo; stipite gracili sursum dilatato furfuraceo glabrescente; lamellis angustissimis decurrentibus.

Scattered on blackened dead wood.

Pileus $\frac{3}{4}$ inch across when expanded; stem 1 inch high, not a line thick.

ADMIRALTY ISLANDS.—Endemic as far as at present known.

Lentinus villosus, Fries.

Lentinus villosus, Fries, Ep., p. 388; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—West Africa, Cuba, San Domingo, and Brazil.

Polyporus (Mesopus) xanthopus, Fries.

Polyporus (Mesopus) xanthopus, Fries, Obs., ii. p. 285; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49

ADMIRALTY ISLANDS.—Widely diffused in tropical regions.

Polyporus (Pleuropus) affinis, Nees.

Polyporus (Pleuropus) affinis, Nees; Fries, Ep., p. 445; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—Australia to the Philippines, Nicobars, and Pegu; also in Brazil.

Polyporus (Pleuropus) sanguineus, Fries.

Polyporus (Pleuropus) sanguineus, Fries, Ep., p. 444; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—This species inhabits all tropical and subtropical countries.

Polyporus (Mesopus) grammocephalus, Berkl.

Polyporus (*Mesopus*) *grammocephalus*, Berkl. (in Hook. Lond. Journ. Bot., i. (1842), p. 148, et in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—Australia to the Philippines, India, and Ceylon, and also in the West Indies and Brazil.

Polyporus (Pleuropus) elegans, Fries.

Polyporus (*Pleuropus*) *elegans*, Fries, Ep., p. 440; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—Europe, North India, Tasmania, West Indies, and widely spread in North America.

Polyporus (Pleuropus) rasipes, Berkl.

Polyporus (*Pleuropus*) *rasipes*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Pileo flabelliformi conchato sericeo lineato subvelutino zonato rufo, exsiccato incurvo; stipite brevi applanato hispidulo; hymenio pallido; poris minutis angulatis, dissepimentis tenuibus.

Pileus $\frac{3}{4}$ to 1 inch across; stem $\frac{1}{4}$ inch high, dilated upwards; pores $\frac{1}{100}$ inch in diameter. Much contracted when dry. The short hairs on the stem sometimes pointing upwards.

ADMIRALTY ISLANDS.—This species was founded on the insular specimens collected by Mr Moseley, but it has also been collected in Australia.

Polyporus (Pleuropus) stereinus, Berkl. et Cooke.

Polyporus (*Pleuropus*) *stereinus*, Berkl. et Cooke in Journ. Linn. Soc. Lond., x. p. 308; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—Also inhabiting Java and Brazil.

Polyporus (Placodermei) igniarius, Fries.

Polyporus (*Placodermei*) *igniarius*, Fries, Hymen. Eur., p. 559; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—This is known from Europe, Socotra, Ceylon, Siam, Tasmania, South Africa, and in America from the United States southward to the island of Juan Fernandez.

Polyporus (Placodermei) australis, Fries.

Polyporus (*Placodermei*) *australis*, Fries, Hymen. Eur., p. 556; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

ADMIRALTY ISLANDS.—Spread over nearly all tropical and subtropical countries, and extending into temperate regions in Europe and New Zealand.

Polyporus (Placodermei) exotephrus, Berkl.

Polyporus (*Placodermei*) *exotephrus*, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 49.

Durius; pileo sulcato-zonato, primitus subtiliter tomentoso glabrescente, margine sulcato prominulo obtuso lobato; contextu ligni colore; poris brunneo-ferrugineis minutis.

Pileus 2¼ inches wide.

Has somewhat the appearance of *Polyporus caliginosus*, Berkl.; but the flesh is pallid, not deeply ferruginous.

Admiralty Islands.—Endemic as far as at present known.

Polyporus (Placodermei) caliginosus, Berkl.

Polyporus (*Placodermei*) *caliginosus*, Berkl. in Journ. Linn. Soc. Lond., xvi. pp. 46 et 50.

Admiralty Islands.—Described from specimens collected by Mr Moseley in the Philippine Islands. Found also in the Solomon Islands.

Polyporus (Placodermei) persoonii, Fries.

Polyporus (*Placodermei*) *persoonii*, Fries; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.
Dædalea (*Apus*) *sanguinea*, Klotzsch in Linnæa, viii. p. 481.

Admiralty Islands.—Ceylon, Pegu, the Moluccas, Australia, and Bahia.

Trametes occidentalis, Fries.

Trametes occidentalis, Fries, Ep., p. 491; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

Admiralty Islands.—This has been collected in nearly all tropical countries.

Trametes lactinea, Berkl.

Trametes lactinea, Berkl. in Ann. Nat. Hist., x. p. 373, et in Journ. Linn. Soc. Lond., xvi. p. 50.

Admiralty Islands.—Ceylon, Australia, and West Africa in the Old World, and Cuba and Brazil in the New World.

Hexagona similis, Berkl.

Hexagona similis, Berkl. in Hook. Lond. Journ. Bot., 1846, p. 4, et in Journ. Linn. Soc. Lond., xvi. p. 50 (errore *affinis*).

Admiralty Islands.—Also in Ceylon and Australia, and quite recently collected in the Solomon Islands by Dr Guppy.

Hexagona picta, Berkl.

Hexagona picta, Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

Pileo dimidiato, postice sanguineo-rufo, antice pallido, lineato-ruguloso plicato, primum pulverulento; hymenio umbrino; poris hic illic margine undulatis.

Pileus 2½ to 3 inches wide, ¾ inch long; pores $\frac{1}{24}$ inch in diameter.

ADMIRALTY ISLANDS.—Endemic, as far as at present known.

Laschia tremellosa, Fries.

Laschia tremellosa, Fries; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—South India, Ceylon, Mauritius, Java, the West Indies, Mexico, and South America.

Stereum elegans, Fries.

Stereum elegans, Fries, Ep., p. 545; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—Bombay, Ceylon, Australia, Tasmania, West Indies, and South America.

Thelephora lamellata, Berkl. et Curt.

Thelephora lamellata, Berkl. et Curt. in U.S. Expl. Exped., xvii. p. 199, t. 1, fig. 7, et Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—Also in the Fiji and Solomon Islands.

Hirneola polytricha, Mont.

Hirneola polytricha, Mont., Syllog. Gen. et Sp. Pl. Crypt., p. 181; Berkl. in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—This species is spread over nearly all tropical and subtropical countries, including many of the islands of Polynesia.

Hirneola rufa, Berkl.

Hirneola rufa, Berkl. in Ann. Nat. Hist., x. p. 384, et in Journ. Linn. Soc. Lond., xvi. p. 50.

ADMIRALTY ISLANDS.—Ceylon.

Peziza hindsii, Berkl.

Peziza hindsii, Berkl. in Hook. Lond. Journ. Bot., 1842, p. 456, et in Journ. Linn. Soc. Lond., xvi. p. 50; Cooke, Mycographia, t. 51, fig. 200.

"The largest, very thin specimens, from the base of littoral trees, were constantly being bathed and often immersed in sea-water."

ADMIRALTY ISLANDS.—Ceylon; Arrou; New Zealand; San Domingo; Cuba; Guiana; Brazil.

ALGÆ.

MELANOSPERMEÆ.[1]

Sargassum ilicifolium, J. Agardh.

Sargassum ilicifolium, J. Agardh; Kütz., Sp. Alg., p. 625 (*Carpacanthus*); Dickie in Journ. Linn. Soc. Lond., xv. p. 238.
Fucus ilicifolius, Turner, Hist., t. 51.

ADMIRALTY ISLANDS.—Widely diffused in tropical seas, but we have seen no Australian specimens.

Sargassum heterocystum, Mont.?

Sargassum heterocystum, Mont., Syllog. Gen. et Sp. Pl. Crypt., p. 384? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—The species was founded upon specimens from the waters of Cochin-China.

Sargassum berberifolium, J. Agardh.

Sargassum berberifolium, J. Agardh, Sp. Alg., i. p. 337; Harv., Phycol. Austr., v. p. 9; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—West Australia, and also collected by Gaudichaud at the Admiralty Islands on Freycinet's voyage.

Sargassum aquifolium, Agardh.

Sargassum aquifolium, Agardh; J. Agardh, Sp. Alg., i. p. 330; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Malayan Archipelago.

Sargassum gracile, J. Agardh?

Sargassum gracile, J. Agardh, Sp. Alg., i. p. 310? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—The true *Sargassum gracile* is widely dispersed on the shores of the Indian Ocean.

Sargassum vulgare, Agardh.

Sargassum vulgare, Agardh; J. Agardh, Sp. Alg., i. p. 342; Harv., Phycol. Austr., v. p. 6; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Widely diffused in both hemispheres.

Sargassum lanceolatum, J. Agardh?

Sargassum lanceolatum, J. Agardh, Sp. Alg., i. p. 335? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Western Australia.

[1] Extracted from the *Journ. Linn. Soc. Lond.*, xv. 1877, with remarks on distribution added.

Sargassum polycystum, Agardh ?

Sargassum polycystum, Agardh; J. Agardh, Sp. Alg., i. p. 310? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—On the coast of Cochin-China, Singapore, and Java.

Cystophyllum muricatum, Agardh.

Cystophyllum muricatum, Agardh; J. Agardh, Sp. Alg., i. p. 231; Harv., Phycol. Austr., v. p. 8; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Australia and Indian Archipelago.

Turbinaria vulgaris, J. Agardh.

Turbinaria vulgaris, J. Agardh, Sp. Alg., i. p. 267 (*varietates plures*); Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—This is found in the warmer parts of all the great seas; and it was collected by Mr Moseley at the Arrou, Philippine, Society, and Sandwich Islands.

Padina pavonia, Linn.

Padina pavonia, Linn.; J. Agardh, Sp. Alg., i. p. 113; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Generally diffused in tropical and temperate seas.

Dictyota dichotoma, Lamour.

Dictyota dichotoma, Lamour.; J. Agardh, Sp. Alg., i. p. 92; Harv., Phycol. Austr., v. p. 12; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Common in both north and south temperate seas; rarer within the tropics.

Ectocarpus sordidus, Harv.?

Ectocarpus sordidus, Harv. in Hook. f. Fl. Tasm., ii. p. 294? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—The original was from the shores of Tasmania, and we have seen no other specimens.

Sphacelaria furcigera, Kütz.

Sphacelaria furcigera, Kütz.; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Also collected by Mr Moseley at the Sandwich Islands.

RHODOSPERMEÆ.

Acanthophora thierii, Lamour.

Acanthophora thierii, Lamour.; Harv., Nereis Austr., p. 34, et Phycol. Austr., v. p. 17; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Generally diffused in tropical and subtropical seas.

Laurencia obtusa, Lamour.

Laurencia obtusa, Lamour.; Kütz., Sp. Alg., p. 854; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—In the Atlantic from the British Islands to Brazil and the Cape of Good Hope; also in the Indian and Pacific Oceans.

Laurencia papillosa, Grev.?

Laurencia papillosa, Grev.? Kütz., Sp. Alg., p. 855? Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—This species is found in the Atlantic, Pacific, and Indian Oceans.

Laurencia forsteri, Grev.

Laurencia forsteri, Grev.; Kütz., Sp. Alg., p. 854; Hook. f., Handb. Fl. N. Zeal., p. 676; Dickie in Journ. Linn. Soc. Lond., xv. p. 238.

ADMIRALTY ISLANDS.—Australia, Tasmania, and New Zealand.

Mastophora lamourouxii, Dcne.

Mastophora lamourouxii, Dcne.; Harv., Nereis Austr., t. 41, et Phycol. Austr., v. p. 30; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Common on the coasts of Australia, and extending through the Malayan Archipelago to Java; also South Africa.

Amphiroa fragilissima, Linn.

Amphiroa fragilissima, Linn.; Kütz., Sp. Alg., p. 700; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Bermuda, West Indies, Pacific coast of South America, and the Malayan Archipelago.

Amphiroa involuta, Kütz.

Amphiroa involuta, Kütz.; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.

Melobesia verrucata, Lamour.

Melobesia verrucata, Lamour.; Kütz., Sp. Alg., p. 696; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Mediterranean and Southern Ocean.

Jania rubens, Lamour.

Jania rubens, Lamour.; Kütz., Sp. Alg., p. 709; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Shores of Europe and America, Red Sea, Indian Ocean, and Pacific.

Desmia ambigua, Grev.

Desmia ambigua, Grev.; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Indian and Pacific Oceans.

Gracilaria dactyloides, Sond.

Gracilaria dactyloides, Sond.; Harv., Phycol. Austr., ii. p. 80; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—A common West Australian species.

Gracilaria confervoides, Grev. var. ?

Gracilaria confervoides, Grev. var.? Kütz., Phycol. Gener., p. 408, Sp. Alg., p. 772 (*Sphærococcus*); Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—*Gracilaria confervoides* is found in the temperate seas of both hemispheres, rarer in the tropics, yet very widely spread.

Gracilaria corniculata, J. Agardh.

Gracilaria corniculata, J. Agardh, Sp. Alg., ii. p. 595; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Austral

Corallopsis australasica, Sond.

Corallopsis australasica, Sond. in Linnæa, xxv. p. 687; Harv., Phycol. Austr., v. p. 35; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Australia.

Gelidium rigidum, Vahl ?

Gelidium rigidum, Vahl? Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—This is probably a variety of the almost cosmopolitan *Gelidium corneum*, Lamour.

Hypnea divaricata, Grev.

Hypnea divaricata, Grev.; J. Agardh, Sp. Alg., ii. p. 448; Harv., Phycol. Austr., v. p. 36; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—West Australian coasts, Indian Ocean, Gulf of Mexico.

CHLOROSPERMEÆ.

Caulerpa clavifera, Agardh.

Caulerpa clavifera, Agardh, Sp. Alg., p. 437; Kütz., Sp. Alg., p. 498 (*Chauvinia*); Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Warmer parts of the Atlantic, Pacific, and Indian Oceans.

Valonia fastigiata, Harv.

Valonia fastigiata, Harv.; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—There are specimens in the Kew Herbarium from the Friendly Islands, Philippines, and Mauritius.

Halimeda triloba, Dcne.

Halimeda triloba, Dcne. in Ann. Sci. Nat., sér. 2, xviii. p. 102; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—The only other specimens we have seen are from Ceylon.

Halimeda opuntia, Lamour.

Halimeda opuntia, Lamour.; Kütz., Sp. Alg., p. 724 (*Catenella*); Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—This is generally diffused in the warmer seas.

Halimeda macroloba, Dcne.

Halimeda macroloba, Dcne. in Archiv. Mus. Par., 1841, ii. p. 118, et in Ann. Sci. Nat., sér. 2, xviii. p. 103; Dickie in Journ. Linn. Soc. Lond., xv. p. 239.

ADMIRALTY ISLANDS.—Australia, Polynesia, Malayan Archipelago, Ceylon, and Eastern Africa.

APPENDIX.

ON THE DISPERSAL OF PLANTS BY OCEANIC CURRENTS AND BIRDS.

Historical.

In collecting the material for the reports on the vegetation of the various oceanic islands dealt with in this work, many interesting facts concerning the active part played by the sea itself in the dispersion of plants have come to light; and, as Mr Moseley devoted special attention to this subject during the voyage of the Challenger, a brief review of the evidence before us appropriately follows here. It is true that Mr Moseley has already recorded [1] many of his observations, but they are scattered, and to a certain extent inaccessible, while a considerable collection of drift seeds and seed-vessels made by him about seventy miles north-east of Point D'Urville, New Guinea, has hitherto remained undescribed.

The diffusion of plants by oceanic currents and tides is by no means a new subject of inquiry, having long ago engaged the attention of some of the foremost writers on plant distribution; and isolated facts relating thereto are recorded in various books of travel and other publications. Among the earlier notices of the transport of seeds by the sea are those relating to various American kinds thrown up on the western coast of Europe. Sloane [2] gives "an account of four sorts of strange beans frequently cast on shore in the Orkney Isles," which he states were very fresh, being little injured by the sea. Three of them he recognised as having been seen by him growing in Jamaica: they were *Entada scandens*, *Guilandina bonduc*, and *Mucuna pruriens*. That the *Entada* retains its germinative power after the transport across the Atlantic we have evidence,[3] from the fact that five plants were raised at Kew from seeds collected in the Azores. Again, Robert Brown states [4] that Sir Joseph Banks informed him that he had received the drawing of a plant, which his correspondent assured him was raised from a seed found on the west coast of Ireland, and that the plant was indisputably *Guilandina bonduc*. Tonning [5] has the following note on fruits stranded in Norway: "Præter hasce jam memoratas Plantas spontaneas nec omittere possum Fructus nonnullos Americanos, qui ad oras nostras maritimas quovis fere anno rejiciuntur. Aut per oceanum, quo via ex America patet, aut et interdum, quod tamen rarius, per naufragia ad nostra litora transnatant." The fruits he

[1] Notes by a Naturalist on the Challenger, *passim*.

[2] *Philosophical Transactions of the Royal Society of London*, 1696, xix. p. 298.

[3] *Natural History Review*, 1863, p. 196, in note.

[4] Tuckey's Narrative of an Expedition to explore the River Zaire, Appendix v., p. 481.

[5] Amœnitates Academicæ, vii. p. 477.

enumerates are *Cassia fistula*, *Anacardium occidentale*, *Cucurbita lagenaria*, *Mimosa scandens*, *Piscidia erythrina*, and *Cocos nucifera*. This is the only record that has come under our observation of the cocoa-nut being washed ashore in Europe, for Linnæus merely repeats this; but it is probably of no rare occurrence, considering the vast quantities that are brought hither; and those found on the Norwegian coast were almost certainly from a wrecked ship, or had been cast or washed overboard. Linnæus, too, mentions, among the various means by which the geographical areas of plants are extended: "Oceanus, modo nondum cuiquam cognito, semina *Cassiæ fistulæ*, *Anacardii occidentalis*, *Mimosæ scandentis* [*Entadæ scandentis*], et *Cocos nuciferæ* ad littora usque Norvegiæ volvit, eaque, quod miraberis, adeo vegeta, ut terræ mandata germinent ac crescant."[1] The first of these four plants was raised by Martins[2] from seed stranded on the shore of Montpellier in 1856; but, as that author observes, the seeds are in separate compartments, which are apparently water-tight, and they are thus protected from the influence of the sea-water. Several other instances might be cited of plants having been raised in Europe from seeds which have traversed the Atlantic, but sufficient have been given for the purpose.

Chamisso seems to have been one of the first to record the fact[3] that foreign seeds are cast ashore in a living state by the waves in various parts of the world. As cited by Darwin,[4] he says of the Radack Archipelago, North-western Polynesia: "The sea brings to these islands the seeds and fruits of many trees, most of which have not yet grown here. The greater part of these seeds appear to have not yet lost the capability of growing." And in another place he speaks of the vast quantity of vegetable matter observed drifting in the sea in various parts of the Malayan Archipelago, naming several plants whose seeds or seed-vessels were prominent in this drift. As they are all included or incidentally mentioned in the following enumeration, it is unnecessary to give further particulars here.

Gaudichaud is another botanical traveller who paid special attention to littoral vegetation and floating vegetable matter. In the Botany of the Voyage of the "Uranie" and the "Physicienne,"[5] he devotes nearly 150 pages to general observations on the nature and composition of the vegetation of the various places visited during the course of the expedition; and, as already mentioned in the Introductory Notes of the Report on the Botany of the Admiralty Islands, several islands were visited in the extreme west of Polynesia and the east of the Malayan Archipelago, which still remain imperfectly known. He dwells particularly on the magnificent vegetation of the Moluccas, which, he says,

[1] Coloniæ Plantarum, Amœnitates Academicæ, viii. p. 3.

[2] Experiences sur la persistance de la vitalité des graines flottant à la surface de la mer, Bulletin de la Société Botanique de France, iv., 1857, p. 325.

[3] Kotzebue's First Voyage, iii. p. 155.

[4] Journal of Researches, ed. 1884, p. 455.

[5] Voyage autour du monde, exécuté sur les corvettes de S.M. l'Uranie et la Physicienne, pendant les années 1817, 1818, 1819, et 1820. Botanique, pp. 1–146.

seems to dispute with the waves the possession of the soil. Such trees as *Bruguiera*, *Rhizophora*, *Ægiceras*, *Laguncularia*, *Sonneratia*, *Barringtonia* and *Calophyllum* actually advance into the sea in all directions. "Not only are their roots, and often portions of their trunks, immersed in the water, but their branching crowns incline in the same direction, and are bathed by the waves of the high tides. This phenomenon is specially observable in the case of *Calophyllum inophyllum* and *Barringtonia speciosa*, which even in such situations attain astonishing dimensions; and these trees were so crowded in some localities that landing was difficult." "Under these circumstances," he continues, "it is not surprising that the numerous currents which plough the Molucca Sea are charged with an immeasurable quantity of vegetable matter. Intermixed with seaweeds in these currents are leaves, flowers, and fruits, and even whole trees. Among flowers remarkable for their colour, for their number, or for their size, we distinguished those of several arboreous Apocynaceæ belonging to the genera *Plumeria* and *Tabernæmontana*; those of *Musa*, *Mucuna*, *Erythrina*, and *Portlandia*, and especially those of *Agati grandiflora* and *Spathodea longiflora*." Prominent among the fruits, he mentions the cocoa-nut, areca-nut, and those of various other palms; *Barringtonia speciosa*, *Eugenia malaccensis*, *Xylocarpus granatum*; the open follicles of two or three species of *Sterculia*; pods of *Galedupa* [*Pongamia*], *Dolichos*, *Abrus*, *Omphalobium*, *Agati*, and *Adenanthera*, invariably containing their seeds; the drupaceous, fleshy, or woody fruits of *Cycas*, *Terminalia*, *Heritiera*, *Calophyllum*, and three or four species of *Myristica*; the long capsules of some Bignoniaceæ; the tunicated fruit of *Hernandia sonora*, and, finally, the fleshy fruit of *Tabernæmontana aurantiaca*, which exactly resembles an orange in shape and colour.

Alphonse De Candolle,[1] who contends that oceanic currents have played a comparatively unimportant part in the diffusion of plants generally, nevertheless regards the sea as the conveying agent of many littoral plants from one country to another.

LIST OF PLANTS REGARDED BY A. DE CANDOLLE AS HAVING PROBABLY OR POSSIBLY BEEN DIFFUSED BY OCEANIC CURRENTS.

Origin probably American.

Naturalised in Africa only.

Drepanocarpus lunatus, Mey.
Ecastaphyllum brownei, Pers.
Mucuna urens, DC.
Chrysobalanus icaco, Linn.
Telanthera maritima, Moq.
Alternanthera achyrantha, R. Br.
Iresine vermicularis, Moq.
Iresine aggregata, Moq.
Remirea maritima, Aubl.

Naturalised in Asia only.

Tephrosia piscatoria, Pers.

[1] Geographie Botanique Raisonnée, ii. p. 792–796.

Naturalised in Africa and Asia.

Hibiscus tiliaceus, Linn.
Acacia farnesiana, Willd.
Rhizophora mangle, Linn.[1]
Batatas pentaphylla, Choisy.

Origin Asiatic or African.

Naturalised in America.

Guilandina bonduc, Linn.
Abrus precatorius, Linn.
Scævola lobelia, Linn.
Batatas paniculata, Choisy.
Ipomœa pes-caprœ, Sweet.

Transported from the Old World into the New, or the reverse; but of doubtful origin.

Telanthera frutescens, Linn.
Stenotaphrum americanum, Schranck.
Sporobolus virginicus, Kunth.

Common to Asia, Africa, and America, without any clue to its origin.

Canavalia obtusifolia, DC.

The majority of the plants in the preceding list come under consideration in this work, and many of them are now known to have a much wider range than De Candolle attributed to them, particulars of which may be found by consulting the indexes to the various parts. Others, such as *Remirea maritima* and *Abrus precatorius*, although not coming within the scope of this work, are very widely dispersed in maritime districts.

The lack, however, of reliable and circumstantial evidence of the dispersion of plants by oceanic currents was commented upon by De Candolle in the admirable work named, and since the date of its publication (1855) the subject has received considerable attention, though, as the sequel shows, very much remains to be done before we shall be in a position to measure the probable extent of oceanic influence in the dispersion of land plants. Too many writers have generalised on the topic, without recording the data upon which their generalisations were founded. This was not due, doubtless, to a want of observation, but rather to inappreciation of the importance of recording, at the time of observation, facts trifling in themselves taken separately, but significant in the aggregate. Darwin very fully realised on his travels the necessity for actually noting small facts, and he thereby provided himself with materials for a lifelong study; and his example has been followed by many of the most successful of living naturalists. At p. 113 of the Report on the Botany of the South-eastern Moluccas, will be found a list of the plants collected by Darwin in the Keeling Islands, all of which he regarded as having been transported thither by the waves of the sea; and further evidence of the action of the sea in various parts of the world substantially confirms this view. The question arising again after his return home, he carried out and published[2] the results of a series of experiments to test how long various different seeds would bear immersion in sea-water without losing their

[1] The Asiatic species is distinct, see *ante*, p. 149.

[2] *Gardener's Chronicle*, 1855, and *Journ. Linn. Soc. Lond.*, i. p. 130.

vitality. In this he was assisted by Sir Joseph Hooker, and the Rev. M. J. Berkeley conducted a similar set of experiments, the results of which first appeared separately in the Gardener's Chronicle, afterwards jointly with Darwin's in the Journal of the Linnean Society. The principal fact ascertained from these experiments was that the seeds of many plants belonging to the most widely different natural orders germinated after long immersion in sea-water—some after upwards of 100 days; and these were not by any means all seeds of plants which naturally inhabit the sea-shore or salt marshes; yet among them were *Atriplex, Beta, Spinacia,* and *Rheum.* A species of *Capsicum* endured the trial best, thirty seeds out of fifty-six having germinated well after 137 days' immersion. But Darwin was led to believe from these experiments that he had previously over-estimated the action of the sea on the dispersion of plants, for he says:—"I soon became aware that most seeds, in accordance with the common experience of gardeners, sink in water; at least I have found this to be the case, after a few days, with the fifty-one kinds of seeds which I have myself tried; so that such seeds could not possibly be transported by sea-currents beyond a very short distance. Some few seeds, however, do float, as I have tried with some of those cast by the Gulf Stream on the coast of Norway. From knowing that timber is often cast on the shores of oceanic islands, far from the mainland, and from having met with accounts of floating vegetable rubbish off estuaries, I assumed that plants, with ripe seeds, washed into the sea by rivers, landslips, &c., might be drifted by sea-currents during a period of some weeks. The closing of capsules, of pods, and of the heads of Compositæ, &c., when wetted, and their re-opening when cast on shore and dried, the seeds being thus allowed to be driven inland by the first stormy winds, seemed to favour such means of transport. But in putting thirty-four plants of different orders, with ripe fruit, into salt water, one alone (*Euonymus*) floated a month, being buoyed up by its fruit; the others all sank in twenty-one days, some in five, and several in seven, nine, and eleven days. But I am not sure that I have made the trial fairly, for I kept the floating plants in too warm and dark a place, which might have favoured their decay."

Of course, Darwin's experiments proved nothing of any plants not tried, and not everything bearing on the question of those that were tried. Thus, the seed-vessels, enclosing seeds, of some of them might float, though on looking through the list very few of the species are such as are likely to be conveyed from place to place by the sea, except under extraordinary circumstances. Subsequently Darwin made some more experiments, and he found that many things which sank when green, or floated only a short time, floated a long time when dry.[1] Thus, ripe hazel-nuts sank immediately, but when dried they floated for ninety days, and afterwards when planted they germinated. An asparagus plant with ripe berries floated for twenty-three, when dried it floated for eighty-five days, and the seeds afterwards germinated. Ripe seeds of *Heloscíadium* sank in two

[1] Origin of Species, p. 359.

days; when dried they floated more than ninety days, and afterwards germinated. He also alludes to another way in which the sea might indirectly assist in the dispersion of plants.[1] "But seeds may be occasionally transported in another manner. Drift timber is thrown up on most islands, even on those in the midst of the widest oceans; and the natives of the coral islands in the Pacific procure stones for their tools solely from the roots of drifted trees. I find, on examination, that when irregularly-shaped stones are embedded in the roots of trees, small parcels of earth are frequently enclosed in their interstices and behind them—so perfectly, that not a particle could be washed away in the longest transport: out of one small portion of earth thus completely enclosed by wood in an oak about fifty years old, three dicotyledonous plants germinated. I am certain of the accuracy of this observation. Again, I can show that the carcases of birds, when floating on the sea, sometimes escape being immediately devoured; and seeds of many kinds in the crops of floating birds long retain their vitality. Peas and vetches, for instance, are killed by even a few days' immersion in sea-water; but some taken out of the crop of a pigeon which had floated on artificial salt water for thirty days, to my surprise, nearly all germinated."

Two years later Professor Ch. Martins, of Montpellier, published[2] an account of some similar experiments tried by him with mostly different kinds of seeds. He first of all noted which of them floated in sea-water; but it is not clear whether the trial was merely momentary or prolonged. However, of ninety-eight kinds of seeds and seed-vessels containing seeds, fifty-nine, we are informed, floated. Instead of plunging them in water, as Darwin and Berkeley did, Martins employed a perforated box, with as many compartments as kinds of seeds, and attached it to a buoy, so that it rose and fell with the waves, and the seeds were thus alternately exposed to the air and water, as they would be if floating free. After forty-five days' exposure the box was opened, when it was found that forty-one kinds of seed out of ninety-eight were rotten. The remaining fifty-seven apparently sound ones were sown, and of these thirty-five germinated; but as sixteen of them were of greater specific gravity than sea-water, they would have to be deducted, leaving only nineteen species out of ninety-eight that might possibly germinate and establish themselves on a coast after floating for six weeks on the surface of the sea. These nineteen species were: *Asclepias cornuti, Asphodelus cerasiferus, Beta vulgaris, Cakile maritima, Cucurbita pepo, Ephedra distachya, Eryngium maritimum, Euphorbia paralias, Gingko biloba, Linum maritimum, Nelumbium speciosum, Paliurus aculeatus, Pancratium maritimum, Ricinus africanus, Ricinus communis,*[3] *Rumex aquaticus, Salsola kali, Scabiosa maritima,* and *Xanthium macrocarpum.*

About half of the species, it will be seen, are essentially littoral plants, whose seeds are ordinarily exposed to the influence of sea-water.

[1] *Loc. cit.*, p. 360.

[2] Bulletin de la Société Botanique de France, iii. p. 324.

[3] Really varieties of one species.

To test still further the kinds of seeds which appeared sound in the first experiment, thirty-four of them were subjected to a trial of ninety-three days' duration. Only nine of them withstood this trial and germinated, when placed under the most favourable conditions, namely: *Cucurbita pepo, Acacia julibrissin, Xanthium macrocarpum, Beta vulgaris, Rumex aquaticus, Ricinus africanus, Ricinus communis,*[1] *Ephedra distachya,* and *Canna gigantea.* And of these the *Acacia* and *Canna* do not float,[2] so that out of a total of ninety-eight kinds, only seven[3] retained their germinative power after three months floating on the sea. This, as Martins observes, is a very small proportion, and then the chances of their germinating and establishing themselves if cast ashore are infinitesimally small; yet it does not follow, we think, that the sea has exercised a comparatively inappreciable influence in the diffusion of the vegetation of the world, though the number of species so transported be relatively insignificant.

A third series of experiments, with the same object, was undertaken by Mr Gustave Thuret, at the instigation of M. Alphonse De Candolle. The results[4] were much the same as those obtained by Martins; but as the seeds were subjected to a thirteen months' ordeal, it is interesting to note the species that survived and germinated afterwards. They were: *Silene atocion, Hibiscus speciosus, Medicago sativa, Mesembryanthemum crystallinum, Apium graveolens, Cichorium endivia, Campanula laciniata, Lycopersicum esculentum, Phytolacca* sp., and *Beta vulgaris.* From the prolonged period these seeds withstood the action of sea-water it would seem that certain seeds are practically imperishable therein; and, what is more remarkable, Mr Thuret states that several of them not only germinated, but actually grew more vigorously than corresponding samples of the same seed kept dry during the same period. It is noteworthy, too, that the ten plants which underwent this trial, belong to as many different natural orders; and they are not specially maritime plants. Doubtless the condition of the seed at the time of immersion has much to do with its capability of floating, and likewise of its power of enduring the action of sea-water. In a note at the end of Thuret's paper De Candolle reiterates his conviction that oceanic currents exercise extremely little influence in the diffusion of plants, and that it is limited to the littoral element. Thuret[5] himself is more dogmatic, for he says, with the exception of plants that grow naturally on sandy or muddy sea-shores, one could not seriously admit that seeds stranded on the sea-shore would ever find the conditions necessary for their development and the propagation of their species.

Without actual proof of the contrary, this might be treated as a false inference, because we know that many plants, not specially littoral, grow equally well just above the ordinary high-water line as farther inland; and in stormy weather, the only times at

[1] Varieties of one species.
[2] The pods of the former probably would.
[3] Only six, counting the varieties of *Ricinus* as one.
[4] Archives des Sciences de la Bibliothèque Universelle, July 1873, p. 177.
[5] *Loc. cit.*, p. 182.

which vegetable rubbish is cast ashore in large quantities, the waves and the wind combined project light objects, and heavy ones too, for that matter, to a considerable distance beyond the reach of the tides. De Candolle further urges, that admitting a seed having been conveyed to a shore, distant from its original home, and having there germinated, the chances of its not being scorched up by the sun, destroyed by animals, or choked by the shade and roots of plants already in possession of the soil, are exceedingly small. Granting the full force of this remark, there is still something to be said of the chances of escape, and this effected, the astonishing reproductive power developed by some plants when first transported to a foreign soil would give such invaders an advantage over the native plants, and they might in this way soon become more prominent than many of the older inhabitants.

It will be understood that we are not attempting to prove that the sea has been the principal agent, or indeed anything more than quite a subordinate agent, in bringing about the present distribution of plants. Further than this, the action of oceanic currents and birds of passage combined is, in our opinion, insufficient to account for the presence of certain elements in the vegetation of many oceanic islands.

In addition to Mr Moseley's collection of drift-seeds and seed-vessels and records of stranded seeds and plants, and the various other sources of information alluded to in the foregoing paragraphs, there has quite recently been received at Kew, from Mr Morris, Director of Public Gardens and Plantations, Jamaica, a collection of seeds and fruits washed ashore at the Palisadoes Plantation, Jamaica. Combined, these collections will give some idea of what is at present known concerning the dispersion of plants by oceanic currents; and it may also be the means, perhaps, of inducing persons who have opportunities for observing facts connected therewith to put them on record. The collection from off the coast of New Guinea is of as much interest as a specimen of the flora of New Guinea, as it is in relation to the distribution of plants.[1] It is now so long since it was made, that the notes on the state of the various objects may be very wide of what it was when they were taken ten years ago. Moseley describes meeting with the driftwood, &c., in the following words:[2]—

"On February 22, 1875, at noon, the ship was about seventy miles north-east of Point D'Urville, New Guinea, where the great Ambernoh River, the largest river in New Guinea, runs into the sea. This river probably rises in the Charles Lewis Mountains, on the opposite side of New Guinea; these mountains reach up to the great altitude of 16,700 feet. So large is this river, that, even at this great distance from its mouth, we found the sea blocked with driftwood brought down by it. We passed through long lines of driftwood, disposed in curves at right angles to the direction in which lay the river's mouth. The ship's screw had to be constantly stopped for fear it should be fouled by the wood. The logs had evidently not been very long in the water, being covered only by a few

[1] See Narr. Chall. Exp. vol. i. pp. 679, 680, 1885.

[2] Notes by a Naturalist on the Challenger, p. 432, *et seq.*

young barnacles (*Balanus*) and Hydroids. Amongst the logs were many whole uprooted trees. I saw one of these two feet in diameter. The majority of the pieces were of small wood, branches and small stems. The bark was often floating separately. The midribs of the leaves of some pinnate-leaved palm were abundant, and also the stems of a large cane-grass (*Saccharum*), like that so abundant on the shores of the great river Wai Levu, in Fiji.[1] One of these canes was fourteen feet in length, and from one and a half to two inches in diameter. Various fruits of trees and other fragments were abundant, usually floating, confined in the midst of the small aggregations into which the floating timber was almost everywhere gathered. Amongst them were the usual littoral seeds, fruits of two species of *Pandanus*, of *Heritiera littoralis*, of a *Barringtonia*, and of *Ipomœa pes-caprœ*. But besides these fruits of littoral plants, there were seeds [and seed-vessels] of forty or fifty species of more inland plants. Very small seeds were as abundant as large ones, the surface-scum being full of them, so that they could be scooped up in quantities with a fine net. With the seeds occurred one or two flowers, or parts of them. I observed an entire absence of leaves, excepting those of the palm, on the midribs of which some of the pinnæ were still present. The leaves evidently drop first to the bottom, whilst vegetable drift is floating from ashore. Thus, as the rubbish sinks in the sea-water, a deposit abounding in leaves, but with few fruits and little or no wood, will be formed near shore, whilst the wood and fruits will sink to the bottom farther off land. Much of the wood was floating suspended vertically in the water; and, most curiously, logs and short branch pieces thus floating often occurred in separate groups, apart from the horizontally floating timber. The sunken ends of the wood were not weighted by any attached masses of soil or other load of any kind. Possibly the water penetrates certain kinds of wood more easily in one direction, with regard to its growth, than the other. Hence one end becomes water-logged before the other: I could arrive at no other explanation of the circumstance. It is evident that a wide area of the sea off the mouth of the Ambernoh River is thus constantly covered with driftwood, for the floating wood is inhabited by various animals, which seem to belong to it, as it were. The fruits and woods were covered with the eggs of a Gasteropod Mollusk and with a Hydroid, and the interstices were filled with Radiolarians washed into them, and gathered in masses just as Diatoms in the Antarctic Seas are gathered together in the honeycombed ice. Two species of crab inhabit the logs in abundance, and a small *Dendrocœle* Planarian swarms all over the drift matter, and on the living crabs also. A *Lepas* was common on the logs."

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[1] No recognisable specimen of this grass reached Kew.

ENUMERATION

OF THE DRIFT-SEEDS AND SEED-VESSELS[1] COLLECTED OFF THE COAST OF NEW GUINEA.

ANONACEÆ.

THERE are remains of three different species of this order from the New Guinea drift. One is a small free seed, not more than a quarter of an inch in diameter, the genus of which is quite uncertain; the second is a one-seeded stipitate carpel of a species of *Polyalthia* or *Ellipeia*; and the third is a naked seed of unusual shape, which may belong to the genus *Artabotrys*, or to a new one. It resembles the seed of *Artabotrys odoratissimus*, Blume (Fl. Jav., Anon. p. 53, t. 31 B., fig. 8), but instead of being truncate at the base, it is hollowed.

MENISPERMACEÆ.

Chlænandra ovata, Miq.? (Plate LXIV., A.)

Chlænandra ovata, Miq.? in Ann. Mus. Lugd. Bot., iv. p. 83; Beccari, Malesia, i. p. 141.

New Guinea drift.

Dr Beccari, who has devoted so much of his life to the investigation of the flora of the Malayan Archipelago and New Guinea, and to whom a drawing of this empty water-worn seed-vessel was sent, agrees with us that it is a Menispermacea, and he suggests that it may be *Chlænandra ovata*, Miq., of which, however, we can find no description of the fruit. In order to make sure that we had the same thing in view, Dr Beccari returned the drawing, together with half a fruit in the same macerated condition as the one represented in our plate, though it is just possible that his fruit may belong to a different species, for the vascular structure is not the same in the two. In the one he sends the wavy plates are deeply channelled. Whether there be two or not, the fruit is larger than that of any other member of the order that we have seen, though *Hæmatocarpus thomsoni*, Miers, (Contrib. Bot., iii. p. 325, t. 134; Hook. f., Fl. Brit. Ind., i. p. 106), is not far inferior in size, being, without the stipes, an inch and three quarters long. But the *Hæmatocarpus* is nearly oval in shape, whereas the present would seem to have been nearly spherical. The

[1] Bare names without references are given of most of those species already mentioned in this Part.

fruit of the former is described as having a hard, blood-red sarcocarp, with the mesocarp traversed by stout vessels from the thin crustaceous endocarp, and this description applies fairly well to the skeleton fruit from the New Guinea drift, save that the endocarp of this is more woody. When fresh this must have been nearly or quite two inches and a half in diameter. Beccari mentions, *loc. cit.*, that he never found the fruit attached to the plant, but always picked it up from the ground.

The largest fruit of the order described is that of *Macrococculus pomiferus*, Beccari (Malesia, i. p. 161). This is also drupaceous and globose or pyriform, and about four inches long by three inches thick. It is from the same country.

BIXINEÆ.

Pangium edule, Reinw.

Pangium edule, Reinw.; Miq., Fl. Ind. Bat., i. 2, p. 109; Horsf., Pl. Jav. Rar., p. 205, t. 43; Blume, Rumphia, iv. p. 20, t. 178; Blanco, Fl. Philipp., ed. 3, t. 391.

New Guinea drift.

Miquel states that this is generally spread in the Malayan Archipelago, from Sumatra to the Celebes, Amboina, and Ceram, though rare in Amboina; and it is also common in the Philippines; but hitherto it has not been found either in Continental Asia or in Australia. It is commonly cultivated by the Malays for the sake of its large, oleaginous seeds, which are an important article of food. The fruit varies considerably in size and shape, according to Blume, who represents one nine inches long and six inches across the middle. It has a thick fleshy indehiscent pericarp, which must decay before the seeds become free. The broad, irregularly wedge-shaped seeds measure two inches or more in their greatest diameter; and they are provided with a crustaceous testa apparently impervious to water. Only one seed is in the collection, and that is sound, though it has probably lost its germinative power. In its present state it floats with about half its body submerged. Good flowering specimens of this tree are wanted for the Kew Herbarium.

DIPTEROCARPEÆ.

Vateria papuana, Dyer. (Plate LXIV., B.)

Vateria papuana, Dyer, *ante*, p. 123.
Vatica papuana, Dyer in Journ. Bot., 1878, p. 100.
Vateria sp., Beccari in D'Albertis, New Guinea, ii. p. 394.

Fruits from the New Guinea drift, and sea-beach Arrou Islands; flowering specimens and fruits from Ramoi, Southern New Guinea.

In the first place, only flowering specimens of this very distinct Dipterocarp were communicated to Mr Dyer, and as the floral structure agreed with *Vatica*, it was referred

to that genus; but subsequently Dr Beccari sent further specimens, collected by D'Albertis on the Fly River, together with fruits believed to belong to the same species. And fruits exactly like those collected by D'Albertis were found by Moseley in the drift off the mouth of the great Ambernoh River, and on the sea-beach of the Arrou Islands; hence it would appear to be a common tree in the region. Whether it grows in the Arrou Islands or the fruits were washed ashore is uncertain. The genus *Vateria* is spread over the Western Peninsula of India and the Malayan Archipelago; and the present species is remarkable for its much-thickened recurved sepals.

MALVACEÆ.

There are perfectly sound-looking seeds of a species of *Hibiscus* from the New Guinea drift; they will float now, but with their body almost wholly immersed.

STERCULIACEÆ.

Heritiera littoralis, Dryander.

New Guinea drift.

The large crustaceous indehiscent one-seeded carpels of this tree seem to be quite impervious to water, and from their lightness would doubtless float for a long time. The seed is destitute of albumen, but the enormously thick cotyledons fully compensate in the process of nutrition for its absence. Like many other common littoral trees, this flourishes equally well at a distance from the sea.

GUTTIFERÆ.

Calophyllum inophyllum, Linn.

Calophyllum inophyllum, Linn.; Wight, Ic. Pl. Ind. Or., t. 77.

New Guinea drift.

There is a number of the one-seeded, globular fruits of this common littoral tree of the region. They vary in size from three quarters of an inch to one inch and a half in diameter, and in their present condition float with about half of their bulk out of water. The seeds are very oily, the oil being stored in the thick fleshy cotyledons, which fill up the whole cavity of the seed. Seemann (Fl. Vit., p. 12) says that this tree is one of the most common littoral plants in the Fiji group; its round fruits, mixed with the square ones of *Barringtonia speciosa*, the pine-cone like ones of the sago-palm, *Sagus vitiensis*, Wendl., and the flat seeds of *Entada scandens*, Benth., densely cover the sandy beaches. Moseley (Notes by a Naturalist on the Challenger, p. 387) mentions this as one of the earliest inhabitants of newly raised coral islands. "As soon as ever a few littoral trees, such as

Barringtonia and *Calophyllum inophyllum*, have established themselves by means of their drifting seeds on a freshly dry coral islet, the fruit-pigeons alight in the branches in their flight from place to place, and drop the seeds of all kinds of other trees with succulent fruits. I have seen the pigeons thus resting on two or three small littoral trees, which as yet form almost the only vegetation of Observatory Island, a very small islet at Nares Harbour, Admiralty Islands."

Jouan (Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 101), remarks that, without being exactly rare in the Marquesas, it is by no means so common there as in the Society Islands, and a list of the trees remarkable for their size would not be a long one. He adds:—"The poorest soils are not unfavourable to it, for one often sees seeds that have been cast ashore on the coral islands germinating and growing into trees." H. Mann (Proc. Amer. Acad., vii. p. 156) includes it among the plants he regards as having been introduced into the Sandwich Islands by the aborigines.

The genus *Calophyllum* is also represented in the New World, and there are fruits of one species in Mr Morris's collection of seeds and seed-vessels stranded in Jamaica.

OCHNACEÆ.

Brackenridgea sp. (Plate LXIV., E.)

New Guinea drift.

We are indebted to Dr Beccari for the determination of the genus of this singular seed-vessel, of which there were a dozen or more in the collection, all of them more or less encrusted. *Brackenridgea* was founded on a Fijian shrub, differing, among other things, from *Gomphia* in having "the nearly annular ovule and seed curved around a large projection into the cell of the ovary (in the manner of *Menispermum*), which arises from its inner angle near the base" (A. Gray, Bot. U.S. Expl. Exped., i. p. 361, t. 42). A second species, *Brackenridgea zanguebarica*, is figured in Hooker's Icones Plantarum, xi. p. 77, t. 1096, the fruit of which is unknown; but Oliver, *loc. cit.*, says that he regards *Brackenridgea* as a section of *Gomphia* rather than a good genus. *Gomphia hookeri*, Planchon (Hook. Lond. Journ. Bot., vi. p. 3), from the Malayan Peninsula, should likewise be referred to *Brackenridgea*, if the genus be retained. In the present species the curvature of the seed is not caused by a mere intrusion of the side of the carpel; there are two distinct cavities crossing and curving round each other at right angles, the one containing the curved seed, the other empty. This empty cavity gives the fruit its buoyancy.

So far as we are aware, no member of the Ochnaceæ has previously been recorded from New Guinea. Neither Mueller, in his Descriptive Notes on Papuan Plants, nor Beccari, in his Notes on the Plants collected by D'Albertis, in the New Guinea of the latter, includes

any. Since the publication of the Flora Australiensis, a species has been discovered in Queensland, and described by Mueller (Fragm. Phytogr. Austr., v. p. 29) under the name of *Brackenridgea australiana*.

MELIACEÆ.

Carapa moluccensis, Lam.

New Guinea drift.

A maritime tree growing on dry sea-beaches, not in swamps, according to Seemann (Fl. Vit., p. 38), who says that *Carapa obovata*, Blume, which is regarded by some botanists as a variety of *Carapa moluccensis*, has a very different aspect, and invariably inhabits mangrove swamps. Miquel also retains them as distinct species, but from the Museum and Herbarium specimens we are unable to decide whether there be more than one species from this region. The seed-vessel varies very much in size, the larger ones equalling in size a child's head; and the angular, irregularly shaped seeds vary more than one half in size in the same capsule, the larger ones being as much as four or five inches across in the widest part. These seeds are very light, a great part of their bulk consisting of a dense, fibrous, spongy testa enclosing the large embryo. *Carapa* is also represented in the New World.

AMPELIDEÆ.

Leea sambucina, Willd. ?

New Guinea drift.

One fruit only, which certainly belongs to this order, and almost certainly to this genus and species, which is exceedingly common throughout the region. The seed appears quite sound, and a cross section of the fruit so closely agrees with the species in question as to be indistinguishable. It has the characteristic hard testa of the order.

ANACARDIACEÆ.

Dracontomelon ?

New Guinea drift.

Dracontomelon is a small genus restricted to Tropical Asia and Polynesia. The fruit has a fleshy mesocarp enclosing a hard, woody 2–5-celled stone or endocarp. Nothing remains of the fruit except the woody part, and the seed-cells are empty.

Among the indeterminable fruits in the drift collection are several which may belong to this order, but they are too much decayed or insufficiently developed for determination.

LEGUMINOSÆ.

Mucuna sp.

New Guinea drift.

A single seed belonging to this genus. In the Kew Museum there are stranded pods and seeds of various species of *Mucuna* from the east coast of Africa (Kirk), Kaffraria (Hutton), Azores (Darwin), Portsmouth (Dickson), and Lofoten Islands (Blytt).

Dioclea reflexa, Hook. f.

Dioclea reflexa, Hook. f.; Oliver, Fl. Trop. Afr., ii. p. 189; Griseb., Fl. Brit. W. Ind., p. 198.

New Guinea drift.

There are seeds of this in the Kew Museum from Tristan da Cunha, where they were washed ashore. They were collected by Mr Moseley. It is widely spread in Tropical Asia, Africa, and America. The allied *Dioclea violacea*, Mart., inhabits Brazil, and it has also been collected in the Fiji Islands, Tahiti, and the Sandwich Islands, whither it may have been conveyed by currents.

Canavalia obtusifolia, DC.

Canavalia obtusifolia, DC.; Griseb., Fl. Brit. W. Ind., p. 197.

New Guinea drift, and also washed ashore at Palisadoes Plantation, Jamaica.

ROSACEÆ.

Parinarium sp. ?

New Guinea drift.

Parinarium is spread nearly all over the tropical regions, and although the fruit which we have referred to this genus is very much water-worn, the remains of the basal style, together with its general character, are sufficient to prove its affinity. It is not unlike *Parinarium insularum*, A. Gr.

RHIZOPHOREÆ.

Rhizophora mucronata, Lam.

Germinated plantlets in the New Guinea drift.

The somewhat top-shaped fruit of this mangrove is always one-seeded, although the young ovary is two-celled, with two ovules in each cell, and it is only one and a half to two inches long; yet from the embryo within, which in germination protrudes from the top, is developed a radicle of extraordinary length before the fruit leaves the plant. The radicle is spindle-shaped, sharply pointed, often more than a foot in length, and sufficiently heavy to pierce the mud when it falls; at which time the plumule is still quite small. Of

course, as these trees grow only in tidal swamps, salt water does not injure the plantlets thus started in life; but what chances they have of growing when conveyed to a distance and thrown up in a prone position, we do not know. Judging, however, from the wide distribution of the present and other species, they would grow in suitable situations.

Bruguiera rheedii, Wight et Arn.

Germinated plantlets in the New Guinea drift.

The mode of reproduction of this mangrove is exactly the same as in *Rhizophora*, but the fluted radicle does not reach nearly such large dimensions. Like the last, it is very widely diffused in tidal swamps within the tropics in the Old World.

COMBRETACEÆ.

Terminalia sp.

Fruits in the New Guinea drift.

The thick corky pericarp of this fruit is very much water-worn, and beset with animal organisms, yet the seeds are apparently sound. There are many species of this genus, several of which, like *Terminalia catappa*, Linn., are littoral trees, though they grow equally well inland under cultivation. The nearest we have seen to the present is an unnamed one collected in the Fijis by Mr Horne. It may, however, be the common *Terminalia catappa*, which is very widely dispersed in Tropical Asia, and often planted in other tropical countries.

Lumnitzera coccinea, Wight et Arn.

Lumnitzera coccinea, Wight et Arn.; Hook. f., Fl. Brit. Ind., ii. p. 452; Benth., Fl. Austr., ii. p. 503; Miq., Fl. Ind. Bat., i. 1, p. 606; A. Gr., Bot. U.S. Expl. Exped., i. p. 615; Seem., Fl. Vit., p. 94.
Lumnitzera purpurea, Presl, Repert. Bot., i. p. 155.
Laguncularia purpurea, Gaud., Bot. Voy. Freyc., p. 481, t. 4 (*Laguncularia coccinea* in tab.)
Pyrranthus littoreus, Jack in Malay Misc., ii. p. 57.

New Guinea drift.

A shrub or small tree inhabiting mangrove swamps in the Malayan Peninsula and Archipelago, North Eastern Australia, and Western Polynesia. There are Polynesian specimens in the Kew Herbarium from New Caledonia, Samoa, the Fijis, Solomon group, and Funafuti in the Ellice group, but not from any of the islands farther eastward. Seemann states that it is common on the sea-beach of all the islands of the Fijian group. *Lumnitzera racemosa*, Willd., the only other species of the genus, covers nearly the same area as the present, and also extends to the coasts of India proper, Ceylon, and Eastern Africa.

MYRTACEÆ.

Barringtonia speciosa, Linn. f.

Fruits in the New Guinea drift.

There can be no question about the big square fruits of this tree being perfectly at home in salt water. As we have set forth at p. 152, it reaches the most remote islands of the Pacific, and it is one of the first arboreal occupants of newly-raised coral islets. Mr Moseley picked up on the beach of Arrou a large succulent flower of a species of this genus.

RUBIACEÆ.

Guettarda speciosa, Linn. ?

A fruit from the New Guinea drift. Belongs apparently to this very widely diffused littoral shrub or small tree.

APOCYNACEÆ.

Chilocarpus sp. ?

Much decayed fruit in the New Guinea drift.

Cerbera odollam, Gærtn.

Decayed fruits containing dead seeds in the New Guinea drift. The fibrous fruit of this common sea-shore tree would doubtless bear long immersion without injury to the exalbuminous seeds, though the seeds of these are quite dead. There are several unrecognisable fruits in the collection which probably belong to this Order.

Tabernæmontana sp. ?

This is the vermilion-red fruit mentioned by Moseley in the Journal of the Linnean Society (xv. p. 77). He found it in the Admiralty Islands, and abundantly at Arrou, thickly scattered on the mud beneath the trees on the sea-shore, as well as in the drift off the coast of New Guinea. Although the pericarp is completely decayed, the seeds appear to be sound, and the embryo quite perfect. The complicate seeds, with a somewhat corky, rugose testa, do not answer to the description given in Bentham and Hooker's Genera Plantarum, but the seeds of comparatively few species are known. Indeed, this is very near, if not the same as, *Tabernæmontana aurantiaca* of Gaudichaud in Freycinet's Voyage Botanique, pp. 50 and 55, and tab. 61, which was collected in the island of Rawak. Gaudichaud's analysis of the seed, however, represents the embryo nearly as long as the seed, with a radicle longer than the cotyledons, whereas in ours the embryo was found in the axis of the albumen near one end of the seed, and not more than half its length, while the radicle was very short.

CONVOLVULACEÆ.

Among the New Guinea drift-seeds are several species belonging to this order, and probably to *Ipomœa;* and Moseley specially mentions seeing *Ipomœa pes-caprœ* (*Ipomœa bilòba*) in his Notes, reproduced at p. 104. Particulars of the wide distribution of this plant in maritime districts, and the capability of its seeds to bear long immersion in sea-water, are given in Part I., p. 51, II., p. 80, and III., p. 169.

VERBENACEÆ.

Minute fruits from the New Guinea drift, probably belonging to this order.

LAURINEÆ.

In the collection of drift objects there is the very hard crustaceous deeply grooved empty endocarp of an oval, slightly oblique fruit, which may belong to some member of the Laurineæ. There is a similar unnamed fruit in the Kew Museum from Borneo, collected by Motley. Denuded of its outer coat, this is upwards of four inches in length.

Hernandia sp. ?

A single seed in the New Guinea drift.

The testa of the seed is much water-worn, and hardly recognisable, the distinctive annular raphe not being discernible; but the large embryo, with thick, lobed, sub-ruminate cotyledons, is exactly that of *Hernandia*. The species must remain doubtful, but it may be the widely diffused *Hernandia peltata*, or it may be one of the more local species of the region.

CUPULIFERÆ.

Quercus sp. (Plate LXV., H.)

A number of acorns, destitute of cups, from the New Guinea drift.

Unlike many exalbuminous seeds, those of *Quercus* retain their vitality only a very short time, either moist or dry. According to F. von Mueller (Victorian Naturalist, Dec. 1884), D'Albertis found acorns of two kinds of oak drifted down the Fly River, but, as in ours, the cups were washed off. Whether there be any described species of *Quercus* from New Guinea we do not know. In the place cited, however, Mueller describes the foliage of a species of a tree (*Quercus guppyi*, Muell.), discovered in the volcanic island of Oima, one of the Solomon group, by Dr H. B. Guppy of H.M.S. "Lark" during a recent

surveying voyage. This proves not to be an oak, for since the foregoing was written, Dr Guppy's collections have been presented by him to Kew, and the supposed oak, as Prof. Oliver pointed out, is a laurel. It is a species of *Litsea* (*Tetranthera*), very closely allied to an unnamed one at Kew from New Caledonia. It is only fair to Baron Mueller to state that he did not see the fruit which Dr Guppy excusably mistook for acorns; and the resemblance is so strong that a more experienced observer of botanical characters might have been deceived at first sight. The fruit is the shape of a small acorn—that of *Quercus ilex*, for example, and it is seated in a thickened, cupular perianth; and the solitary seed is exalbuminous, with large cotyledons filling the whole cavity.

PALMÆ.

Nipa fruticans, Wurmb.

Seed-vessels in the New Guinea drift.

The comparatively restricted area of this absolutely littoral palm is given in the enumeration of the plants from the South-eastern Moluccas. It is an exceedingly abundant plant in many parts of the Malayan Archipelago especially, covering large areas in the tidal swamps. Chamisso (Bemerkungen auf einer Entdeckungs-Reise) enumerates this among other seeds cast ashore at Java in a germinating condition. Sir Joseph Hooker, describing the vegetation of the Sunderbunds (Himalayan Journals, ii. p. 355), says: "Receding from the Megna, the water became salter and *Nipa fruticans* appeared, throwing up pale yellow-green tufts of feathery leaves from a short, thick, creeping stem, and bearing at the base of its leaves its great head of nuts, of which millions were floating on the water and germinating in the mud." Dr Guppy has recently sent it from the Solomon Islands.

Calamus sp.

Fruits and a cluster of the spines from the rhachis of a leaf in the New Guinea drift. The fruit was decayed, and contained no seed.

PANDANEÆ.

Pandanus spp.

New Guinea drift.

There are no specimens in the collection, but Moseley (Notes by a Naturalist, p. 433) mentions that he observed the seeds of two species.

Besides the foregoing more or less correctly determined seeds and seed-vessels from the New Guinea drift, there are several which we cannot refer even to their natural orders.

SEEDS AND SEED-VESSELS FROM THE SEA-BEACH OF THE ARROU ISLANDS.

DIPTEROCARPEÆ.

Vateria papuana, Dyer, *ante*, p. 123.

Sea-beach, Arrou.

It is uncertain whether this grows in these islands or was accidentally washed ashore; but Beccari (Nuovo Giornale Botanico Italiano, v. 1873, p. 330), in a sketch of the Flora, says it is singular that the Dipterocarpeæ are absent. See also p. 287.

STERCULIACEÆ.

Heritiera littoralis, Dryander.

Sea-beach, Arrou.

This was also found in the New Guinea drift. See p. 288.

MELIACEÆ.

Flindersia amboinensis, Poir. ? (Plate LXIV., C.)

Flindersia amboinensis, Poir. in Lam. Encycl. Method. Suppl., iv. p. 650 ?

Sea-beach, Arrou.

The genus *Flindersia* comprises about six Australian species, and one has recently been discovered in New Guinea. Possibly the capsule represented in our plate belongs to a species distinct from the Amboina one, which is figured by Rumphius (Herb. Amb., iii., p. 201, t. 129). His figure of the seed-vessel, which is reduced, represents it tapering much more at both ends than ours is. *Flindersia oxleyana*, from the Brisbane River, in Queensland, is also very near the present, which, though picked up on the beach, was probably not stranded there, but grew in the island. The capsule is not water-worn, and the fragile seeds are in a good condition.

This ought to have been included in the preceding list of the plants of the South-eastern Moluccas; but it was overlooked, as there was no Herbarium specimen.

APOCYNACEÆ.

Cerbera odollam, Gærtn.

Sea-beach, Arrou.

The distribution and other particulars of this plant will be found at pp. 164 and 293.

PALMÆ.

Orania aruensis, Beccari. (Plate LXV., I.)

Orania aruensis, Beccari, Malesia, i. p. 76.;

Sea-beach, Arrou.

Only the one germinating seed represented in our plate was collected. Dr Beccari furnished the name from a drawing we forwarded to him. This palm was described from specimens collected in the island of Wokan, one of the smaller islands of the Arrou group, where it inhabits very dense, often inundated forests. In a paragraph, *loc. cit.*, p. 9, on the distribution of palms, Dr Beccari calls attention to the fact that the fruits or seeds of very few palms are adapted for wide dispersion. Some, he says, like *Cocos nucifera* and *Nipa fruticans*, are able to resist the action of salt water; and he had also observed that the fruits of *Orania* are often thrown up uninjured from the sea. "Ho osservato che anche i frutti di *Orania* sono spesso rigettati intatti dal mare." But what is more extraordinary, he states that the cassowaries often swallow the fruits of palms which are in no wise fleshy, and carry them considerable distances. In the Arrou Islands, for instance, he saw heaps of the seeds of *Orania aruensis* in their excrement, yet every one was from 55 to 60 millimetres in diameter—that is, from about 2¼ to 2½ inches; the one represented in Plate LXV. is barely 2¼ inches in diameter. Of course, although this be the case, the cassowaries could only assist in the local dispersion of the species. It is certainly remarkable how very local the majority of palms are.

GNETACEÆ.

Gnetum rumphianum, Beccari. (Plate LXIV., D.)

Gnetum rumphianum, Beccari, Malesia, i. p. 182.
Funis gnemoniformis, Rumph., Herb. Amboin., v. p. 11, t. 7.

Sea-beach, Arrou.

We are also indebted to Dr Beccari for the determination of this seed, of which there are several in the collection. In all cases, the outer fleshy envelope of the seed has disappeared, leaving bare the second envelope, which is crustaceous and traversed longitudinally by about fifteen prominent ribs, and is free from the body of the seed except at the base. As shown in the plate, the seeds have begun to germinate by breaking through the apex of this second envelope, which, being free from the body of the seed within and splitting longitudinally, might easily be mistaken for a pericarp. None of the seeds is in a sufficiently advanced stage of germination to enable us to fully explain the mode, which is certainly very singular, and apparently essentially the same as in *Gnetum gnemon*, as described by Bower (Quarterly Journal of Microscopical Science, N. S. xxii. p. 278, t. 25). In the latter the seed is about a quarter the size of ours. The

bulk of the seed of *Gnetum rumphianum* consists of very hard, almost horny albumen, with a small axile embryo. According to Bower the embryo of *Gnetum*, or at least of *Gnetum gnemon*, is not formed until after the seed falls from the parent, but is a development of the seed immediately preceding active germination. In *Gnetum gnemon* there is a lateral outgrowth of the hypocotyledonary part of the embryo growing in such a manner that the rest of the embryo is pushed out from the cavity of the albumen in which it is formed, and develops in the ordinary way, being nourished by the albumen conveyed to it through the lateral outgrowth or "feeder," as it is called. In *Gnetum rumphianum*, judging from the more or less mutilated specimens before us, a cluster of rootlets is given off close to the point at which the protruded part of the embryo emerges; this may have been caused through injury to the primary rootlet, or it may be normal. There is also what we take to be a long, relatively stout hypocotyledonary stem, at the apex of which are the scars of the two cotyledons.

Whether these seeds were washed ashore, or produced by plants growing in the island, is uncertain, but the fact remains that they were picked up on the beach in a germinating condition. Dr Beccari, *loc. cit.*, states that it is apparently common in New Guinea, occurring also in the Arrou Islands, and that he had found the fruit of it in the Celebes. This species, which has been confused with *Gnetum scandens* and others, is easily distinguished from its congeners by the intermediate coat of the seed being ribbed.

Gnetum sp.

Sea-beach, Arrou Islands.

A single seed undoubtedly of this genus, but we are unable to determine the species. It has a smooth secondary envelope.

SEEDS STRANDED AT PALISADOES PLANTATION, JAMAICA.

GUTTIFERÆ.

Calophyllum calaba, Linn.

Calophyllum calaba, Linn.; Jacq., Sel. Stirp. Amer., p. 269, t. 165; Griseb., Fl. Brit. W. Ind., p. 108; Descourt., Fl. Antill., ii. p. 30, t. 74.

Sea-shore, Palisadoes Plantation, Jamaica. Seeds apparently quite sound.

Grisebach states that this tree is common in mountain woods in the West Indies, while Descourtilz says that it inhabits sandy sea-shores, which is more probable, though it may, like *Calophyllum brasiliense*, grow far inland as well as on the sea-shore. Grisebach gives the range of *Calophyllum calaba* as "Cuba to Brazil;" but we have only seen West Indian specimens. It is, however, generally spread there from Cuba to Trinidad. There is a specimen in the Kew Herbarium from the Bahamas, collected by Mr Brace, who notes that it was introduced. It is also planted in the Bermudas.

MELIACEÆ.

Carapa guyanensis, Aubl.

Carapa guyanensis, Aubl., Pl. Guian., iv. t. 387; Griseb., Fl. Brit. W. Ind., p. 131; Oliver, Fl. Trop. Afr., i. p. 336.

Sea-shore at Palisadoes Plantation, Jamaica.

The fruit and seeds of this are rather smaller than those of *Carapa moluccensis*, and although the seeds are not albuminous, the large embryo is very oily. This species inhabits the West Indies, Central America, and Eastern Tropical South America, mostly growing in maritime districts.

ANACARDIACEÆ.

Spondias sp.

Sea-shore at Palisadoes Plantation, Jamaica.

This is probably the Hog-plum (*Spondias lutea*, Linn.), which is common, both wild and cultivated, in many parts of Tropical America and the West Indies, and also on the western coast of Tropical Africa. The fruit is drupaceous, with a bony endocarp.

LEGUMINOSÆ.

Mucuna urens, DC.

Mucuna urens, DC.; Griseb., Fl. Brit. W. Ind., p. 198; Oliver, Fl. Trop. Afr., ii. p. 185; Mann in Proc. Amer. Acad., vii. p. 164; Jouan in Mém. Soc. Sci. Nat. Cherbourg, xi., 1865, p. 106; Seem., Fl. Vit., p. 59.

Sea-shore at Palisadoes Plantation, Jamaica.

This species is widely dispersed in Tropical America, yet Grisebach states that it is uncommon in Jamaica; it is also recorded from the Sandwich and Marquesas Islands; and there are specimens in the Kew Herbarium from various points on the western coast of Tropical Africa. We have seen no Polynesian specimens, but there seems no reason to doubt the records, for the species is easily distinguished. Jouan states that he found a few plants of it in the island of Hiwaoa, Marquesas, but he never saw it in Nukahiva.

Mucuna pruriens, DC.

Mucuna pruriens, DC.; Griseb., Fl. Brit. W. Ind., p. 198; Oliver, Fl. Trop. Afr., ii. p. 187; Seem., Fl. Vit., p. 59; Forst., Fl. Ins. Austr. Prodr., p. 50.

Sea-shore at Palisadoes Plantation, Jamaica.

This is one of the Leguminosæ sometimes washed ashore on the western coast of Europe. It is much more widely dispersed than *Mucuna urens*, though hitherto it has neither been found in Australia, nor in Polynesia, so far as we are aware; and Seemann states that there is no specimen or drawing in the British Museum of the plant from the Tongan Islands named "*Dolichos pruriens*, Linn.?" by Forster.

Ecastaphyllum brownei, Pers.

Ecastophyllum brownei, Pers.; Oliver, Fl. Trop. Afr., ii. p. 236; Chapman, Fl. Southern U.S., Suppl., p. 617.

Sea-shore at Palisadoes Plantation, Jamaica.

A shrub or small tree inhabiting maritime districts from South Florida and Central America, through the West Indies to Brazil, as well as Western Tropical Africa. It has a one-seeded flat pod, from three-quarters to one inch in diameter, and very light. The seeds of this stranded in Jamaica, like most of those collected by Mr Morris, appeared quite sound when they were received.

Cæsalpinia bonduc, Roxb.

Cæsalpinia bonduc, Roxb.; Hook. f., Fl. Brit. Ind., ii. p. 255; Seem., Fl. Vit., p. 66; Mann in Proc. Amer. Acad., vii. p. 164.

Guilandina bonduc, Linn.; Griseb., Fl. Brit. W. Ind., p. 204.

Sea-shore at Palisadoes Plantation, Jamaica.

This species, which is often confounded with the next, may be distinguished, among other things, by its yellow seeds; whereas those of *Cæsalpinia bonducella* are slate or lead coloured. It is by no means so generally dispersed as *Cæsalpinia bonducella*, being unknown from Africa and Australia. There are specimens in the Kew Herbarium from Key West, Florida; from Cuba, Jamaica, Antigua, St Vincent, and Martinique, in the West Indies; from Maisor, Ceylon, various parts of the Malayan Peninsula, and Java, in Asia, and from Norfolk Island and the Fijis in Polynesia.

Cæsalpinia bonducella, Fleming.

Cæsalpinia bonducella, Fleming; Hook. f., Fl. Brit. Ind., ii. p. 254.

Sea-shore at Palisadoes Plantation, Jamaica.

The seeds of this species are commonly thrown up by the waves in various parts of the world, including the coast of Western Europe. There are also specimens in the Kew Museum that were washed ashore in Kaffraria, Tristan da Cunha, and St Helena. In Part II., p. 80, the seeds of this species washed ashore in St Helena are incorrectly referred to as *Cæsalpinia bonduc*. The general distribution of *Cæsalpinia bonducella* will be found at p. 145 of the present part of the Botany of the Challenger Expedition. Among remote islands, which it certainly or probably reached through the agency of the sea, we may name the Bermudas, St Helena, and the Keeling Islands. Sir John H. Lefroy (Botany of Bermuda, p. 68) says that it was found in one place in the Walsingham tract, in 1874, and it was then in flower. In St Helena, according to Melliss (St Helena, p. 263), the seeds are frequently washed ashore on the beach at Sandy Bay; but he had not met with an instance of their having germinated. Darwin (Journal of Researches, ed. 1884, p. 454) specially mentions finding a *Guilandina* on one of the islets of the Keeling group.

Comparatively fresh seeds of *Cæsalpinia bonducella* and of *Cæsalpinia bonduc* were tried at Kew, to see whether they would float in salt water, and the former floated, while the latter sank. Older seeds of the two species were tried with the same result, though the seeds of *Cæsalpinia bonduc* settled down very slowly, and might perhaps float on water of the specific gravity of the Atlantic. Whether the very light pod retains the seeds for any length of time after immersion in water we have been unable to ascertain.

Cassia fistula, Linn.

Cassia fistula, Linn., Amœn. Acad., viii. p. 3; Benth. in Trans. Linn. Soc. Lond., xxvii. p. 514; Oliver, Fl. Trop. Afr., ii. p. 270, *in nota, sub. Cassia sieberiana*; Griseb., Fl. Brit. W. Ind., p. 206.

Sea-shore at Palisadoes Plantation, Jamaica.

This is one of the seeds, already alluded to, recorded by Linnæus as having been thrown up on the coast of Norway in a living condition; and Professor Martins (Bull. Soc. Bot. France, iv. p. 326) states that he had seen seeds which were cast ashore in the south of France germinate perfectly. In the latter case the seeds were still in the pod, and most likely this is usually the case, for the pod is indehiscent and breaks up very tardily. This pod is cylindrical, and from one to two feet long, with numerous seeds separated from each other by transverse partitions. *Cassia fistula* is now very widely diffused in warm countries, both in a wild and cultivated state; but it doubtless owes its present wide area to man rather than any other agency. Bentham treats it as indigenous in Asia, and as possibly so in Africa.

Dimorphandra mora, Benth.

Dimorphandra mora, Benth. in Benth. et Hook. f., Gen. Plant., i. p. 588.
Mora excelsa, Benth. in Trans. Linn. Soc. Lond., xviii. t. 16; Griseb., Fl. Brit. W. Ind., p. 216.

Sea-shore at Palisadoes Plantation, Jamaica.

This is one of the finest and commonest forest trees of British Guiana, and it has also been collected in Trinidad; but it is unknown from elsewhere. Only an empty pod was stranded in Jamaica. The seed of *Dimorphandra mora* is one of the largest of the dicotyledonous class, and its embryo is one of the largest in the vegetable kingdom, being sometimes as much as four and a half inches across the broadest part, in striking contrast to the small embryo of such large monocotyledonous seeds as the cocoa-nut. But this is far surpassed by an undescribed[1] species in the Kew Herbarium, collected by Sutton Hayes in the swamps of the Rio Grande, Panama. An embryo of this, preserved in spirit, and therefore perhaps a little swollen, measures fourteen inches round, and six and a half inches across in the widest part. This is probably the largest embryo in the vegetable kingdom.

[1] *Dimorphandra oleifera*, Triana, MSS. in Herb. Kew. "*Dimorphandræ moræ* affinis, a qua differt foliolis bijugis oblongo-lanceolatis longe acuminatis, spicis lateralibus subsolitariis, legumine semineque multo majori.

Entada scandens, Benth.

Entada scandens, Benth. in Trans. Linn. Soc. Lond., xxx. p. 363.

Sea-shore at Palisadoes Plantation, Jamaica.

It has already been mentioned in the Introductory Notes to this Part that the large seeds of this plant are commonly cast ashore on various parts of the western coast of Europe, and plants have been raised at Kew from seeds picked up in the Azores. As limited by Bentham, this includes the proposed species *Entada gigalobium*, DC., *Entada pursætha*, DC., *Entada monostachya*, DC., *Entada adenanthera*, DC., *Entada rheedii*, Spreng., *Entada parrana*, Spreng., *Entada gandu*, Hoffm., and *Entada rumphii*, Scheff. It is generally diffused in Tropical Asia, Africa, and America, and it has also been found in North-Eastern Australia. It grows also in some parts of Polynesia, as the Fiji and Samoan Islands, but being a climber it only flourishes associated with shrubby or arboreous vegetation. Seemann states that it is common in the mangrove forests all over Viti. Mr J. F. Arundel sent to Kew seeds stranded on Flint Island, South Pacific. Melliss (St Helena, p. 266) states that the seeds of this plant are commonly cast ashore on the windward side of St Helena, where they have been known to germinate and grow into plants of considerable size. Schweinfurth (The Heart of Africa, ii. p. 62) states that seeds have been observed on the northern shores of Nova Zembla. The pods vary in size, but they are always very large, and sometimes they are as much as four or five feet in length by four or five inches in width, yet the branches of the plant are comparatively slender.

CUCURBITACEÆ.

Fevillea cordifolia, Linn.

Fevillea cordifolia, Linn.; Griseb., Fl. Brit. W. Ind., p. 289; Descourt., Fl. Antill., iii. p. 216, t. 198.

Sea-shore at Palisadoes Plantation, Jamaica.

A tall climber with a globose fruit, from four to five inches in diameter, containing a few lenticular seeds about two inches across, and three-quarters of an inch thick. It is very widely spread in Tropical America and the West Indies; and the seeds sent by Mr. Morris look quite sound.

CONVOLVULACEÆ.

Ipomœa pes-capræ, Sweet.

Sea-shore at Palisadoes Plantation, Jamaica. See Part III., p. 169 (*Ipomœa biloba*).

EUPHORBIACEÆ.

Omphalea diandra, Linn.

Omphalea diandra, Linn.; Griseb., Fl. Brit. W. Ind., p. 50; DC., Prodr., xv. 2, p. 1135.

Sea-shore at Palisadoes Plantation, Jamaica.

This plant is of climbing habit, reaching the tops of the highest trees (Sutton Hayes

MSS. in Herb. Kew); and it is widely dispersed in the West Indies and Central and South America, often on river-banks, and sometimes far inland, but also near the sea, for Seemann's specimen from Panamá is labelled "*in maritimis.*" It has the ordinary three-celled and three-seeded fruit of the order, but it is of large size and fleshy, and the subglobose seeds are as much as one inch and a half in diameter, and the large embryo with foliaceous cotyledons is enclosed in a large quantity of oily albumen.

JUGLANDEÆ.

Juglans sp. ?

Sea-shore at Palisadoes Plantation, Jamaica.

The genus *Juglans* is widely dispersed in the northern hemisphere, and three or four species occur in Mexico. The present fruit may belong to the genus *Carya*, which is restricted to North America, including Mexico.

PALMÆ.

Manicaria saccifera, Mart. ?

Sea-shore at Palisadoes Plantation, Jamaica.

The number of species of *Manicaria* known is two or three, but the distribution of *Manicaria saccifera*, Mart., and *Manicaria plukenetii*, Griseb. and Wendl. (Fl. Brit. W. Ind., p. 518), assuming that they are really different species, is nowhere fully recorded. Plukenet (Almagestum Botanicum, ii. p. 278), under *Palmapinus maritima barbadensis et jamaicensis*, has the following note concerning the fruit of *Manicaria saccifera*: "Perrarum hunc fructum externo cortice denudatum habuimus ex Insula Barbados nomine The Sea Apple: quem exindè admirabilem ejus externum involucrum adhuc retinentem, Insula Jamaicæ a se collectum, amice nobis ostendebat D. D. Hans Sloane." And Sloane (Natural History of Jamaica, ii. p. 186) says in allusion to the same fruit: "This is frequently cast up by the waves on the shores of this island, and is one of those fruits thrown on the north-west islands of Scotland by the currents and seas." Whether the palm which bears this fruit grows in either Jamaica or Barbados or not, is uncertain; but Grisebach had seen no specimens from the former island, and the name is not in Maycock's Flora Barbadensis, and there are no specimens from either place in the Kew Herbarium. Still, so much remains to be done in relation to the distribution of palms, that it is quite possible it may exist in Jamaica, at least. Be that as it may, *Manicaria saccifera* is essentially a maritime palm. Martius (Hist. Nat. Palm., ii. p. 141) says: "Crescit pulcherrima Palma in sylvis densis aqua dulci vel subsala inundatis, ad ripas fluminum Amazonum, Tocantius, Acará aliorumque, in canali Tagipurú, in insulis depressis Marajo, Caviana reliquisque omnibus per ostia maritima fluminum Paraënsium sparsis; in interioribus terræ continentis non reperta." The seeds sent by Morris are unsound.

Astrocaryum sp.

Sea-shore at Palisadoes Plantation, Jamaica.

Astrocaryum is a Tropical American genus of perhaps thirty species, but we find no record of any species growing in Jamaica. One species occurs in Trinidad.

RECORDS OF VARIOUS DRIFTED SEEDS GERMINATING AFTER BEING CAST ASHORE.

MALVACEÆ.

Hibiscus tiliaceus, Linn.

Hibiscus tiliaceus, Linn.; Griseb., Fl. Brit. W. Ind., p. 86 (sub. *Paritio*); Seem., Fl. Vit., p. 18.

According to Sir J. H. Lefroy (Bot. Berm., p. 52), this was raised from seed washed ashore in the Bermudas about fifty years ago. It is found on nearly all tropical shores.

AMPELIDEÆ.

Vitis vinifera, Linn.

Vitis vinifera, Linn.; Lefroy, Bot. Berm., p. 61.

Sir J. H. Lefroy says: "An interesting example of the diffusion of plants was afforded by the foundering of the ship 'Minnie Breslauer,' on January 6, 1873, on the south shore. She had a cargo of white Lisbon grapes, many of which were washed on shore, and the seeds germinated at high-water mark. Numbers of plants were, from curiosity, taken up and transplanted, some of which bore fruit in 1876."

SAPINDACEÆ.

Sapindus saponaria, Linn.

Sapindus saponaria, Linn.; Griseb., Fl. Brit. W. Ind., p. 126; Seem., Fl. Vit., p. 47; Jones, Naturalist in Bermuda, p. 190; Forst., Fl. Ins. Austr. Prodr., p. 29.

This common West Indian and South American tree is said to have been raised from seeds washed up on the south shore of the Bermudas. Seemann, *loc. cit.*, says: "I have examined Forster's original specimen of this from Easter Island, preserved at the British Museum, as there was some doubt expressed about its belonging to this species, and, as far as it goes, I find it absolutely identical with the American specimens. Jouan (Mém. Soc. Sci. Nat. Cherbourg, 1865, p. 102) states that *Sapindus saponaria* is very common in the Marquesas, though he does not seem satisfied that it was the same as the West Indian plant, for he poses the question: "Est-ce la même espèce qu' aux Antilles, et comment est-elle venue aux Marquises?" There is no *Sapindus* in the Kew Herbarium from

Polynesia eastward of the Fijis, where there is an endemic species (*Sapindus vitiensis*, Seem.), except in the Sandwich Islands, where there is also an endemic species (*Sapindus oahuensis*, Hildebr.), which is remarkable for its simple leaves. If the Easter Island and Marquesas *Sapindus* be really *Sapindus saponaria*, it is possible that it was carried thither by oceanic currents. But there are two or three Asiatic species so closely allied to *Sapindus saponaria* that the identity of the insular one cannot be satisfactorily settled in the absence of perfect specimens. The fruit of these species is fleshy and indehiscent; and the seed has a very dense, hard testa, capable of protecting the embryo from water for a long period. It is exalbuminous, and the embryo has large fleshy cotyledons.

ANACARDIACEÆ.

Anacardium occidentale, Linn.

Anacardium occidentale, Linn.; Griseb., Fl. Brit. W. Ind., p. 177.

This is not among the stranded fruits in the Kew Museum, but it is one of those enumerated by Linnæus (Amœn. Acad., viii. p. 3) as being cast ashore on the coast of Norway with the seed still in a living condition. Whether the seed-vessel alone, or attached to its enormous fleshy peduncle, was washed up, we are not informed. It is a common Tropical American tree, and is now naturalised in most other hot countries.

EUPHORBIACEÆ.

Aleurites moluccana, Willd.

This is one of the seeds enumerated by Chamisso as being cast upon the coast of Java in a germinating condition. The large seed contains a considerable quantity of albumen, but the embryo is protected by a very dense, woody testa.

Ricinus communis, Linn.

Ricinus communis, Linn.; Darwin, Journal of Researches, ed. 1884, p. 455.

Darwin mentions this, on the authority of Mr A. S. Keating, as one of the seeds cast ashore in the Keeling Islands; but it is not one of which he obtained specimens. It is one of the few plants observed by Dr Copeland in South Trinidad, where, like *Canavalia obtusifolia*, it may possibly have been carried by the waves. It is one of a number of plants, of which a list is given at p. 282, which Professor Martins succeeded in raising from seed that had been floating ninety-three days on the surface of the sea. Like *Aleurites*, it has albuminous seeds, and they are furnished with a very dense, crustaceous testa.

ORCHIDEÆ.

As an instance of what may be effected by the agency of the sea, Moseley (Notes by a Naturalist, p. 368) says: "On the shores of Little Ki Island I found on the beach, above the ordinary reach of the waves, a large mass of the pseudo-bulbs of an epiphytic orchid with its roots complete. It was partly buried at the foot of a tree, and seemed quite lively. It had evidently been washed up in a storm."

PALMÆ.

Cocos nucifera, Linn.

Notwithstanding the fact that the cocoa-nut palm is essentially a littoral tree, is now almost cosmopolitan in the tropics, and the further fact that its seeds or fruit will bear long immersion in sea-water without detriment, it is doubtful whether oceanic currents have played an active part in its diffusion. It is possible, and indeed very probable, that its present wide area is partly due to this agency. For example, the Keeling or Cocos Islands, in the Indian Ocean, do not appear to have been inhabited before 1827, when some Europeans settled there for the express purpose of exporting the products of the cocoa-nut palm, which abounded there. Darwin (Journal of Researches, ed. 1884, pp. 453, 454) states that at first sight the cocoa-nut tree seems to compose the whole wood, and the whole prosperity of the place depends upon it. He also mentions that young and full-grown cocoa-nut trees grew intermingled; so that there can be no doubt of its capability of reproducing itself abundantly unassisted in favourable situations. Another instance may be Cocos Island, off the coast of Central America, in the Pacific; yet it is strange that the cocoa-nut does not exist in the not far distant Galapagos, which lie in the course of currents running from America, and where, according to Collnett, as cited by Darwin (*loc. cit.*, p. 392), various seeds and seed-vessels are washed ashore. Moseley (Notes by a Naturalist) mentions in several places the paucity, or absence, of the cocoa-nut in certain uninhabited islands of the Molucca Sea. And Jouan (Mém. Soc. Sci. Nat. Cherbourg, xi. 1865, p. 127) has the following observations on the distribution of the cocoa-nut in connection with the vegetation of the Marquesas Islands. "Too much has been made, I think, of the influence of oceanic currents in the dispersion of the cocoa-nut, or at least to their unaided influence. The waves may well, as Forster says, and as may be seen every day, have washed ashore cocoa-nuts, which may have germinated, as any kind of soil suits it; but, as I have explained elsewhere, the cocoa-nut tree produces itself with difficulty unassisted. The nuts fall to the ground, where the greater part of them perish without germinating. It is necessary to bury them, or at least to fix them to the soil." He further states, that, according to current traditions, the cocoa-nut was planted in certain islands in the Pacific by the hand of man, while in others it is known to be of recent introduc-

tion. Of course, the waves of the sea may sometimes bury the cocoa-nut as well as cast it ashore. Moreover, under certain conditions, the cocoa-nut may germinate freely without being buried or partially buried, or even without being fixed to the soil. See Tonning's reference to the cocoa-nuts being cast ashore in Norway, *ante*, p. 277.

Sagus sp.

At Malanipa Island, off the coast of Mindanao, Philippines, Mr Moseley found a young sago-palm, which was just beginning to form a stem, washed up just above the ordinary beach-line, and firmly rooted; though in an inclined position, and growing vigorously (Notes by a Naturalist, p. 368).

FRUITS AND SEEDS TAKEN FROM THE CROPS OF FRUIT PIGEONS, SHOT IN THE ADMIRALTY ISLANDS.

In Mr Moseley's Notes, reproduced at p. 229, he records some observations on the part played by carpophagous birds in the dissemination of plants. The collection of fruits he mentions having taken from the crops of a number of a Fruit Pigeon (*Carpophaga rhodinolæma* [1]) contains about a dozen species, of which we have identified :—

Elæocarpus sp.

This fruit is the most numerous of all, and perhaps the least nutritious. Within the thin fleshy coat is an exceedingly hard five-celled indehiscent endocarp. The species of *Elæocarpus* are numerous in Tropical Asia, and a few inhabit Polynesia, Australia, and New Zealand.

Soulamea amara, Lam.

Soulamea amara, Lam., *ante*, p. 235 ; Ann. Wiener. Mus., i. t. 16.

A single empty fruit. This plant is in Dr Guppy's collection from the Solomon Islands, lately received at Kew. It is the *Rex amararis* of Rumphius (Herb. Amboin., ii. p. 129, t. 41).

Rourea ?

Only one small undeveloped worm-eaten fruit. One species of *Rourea* has been found in the Fijis, and one in North Eastern Australia.

Rubiaceæ ?

The mericarps, as well as the entire fruits of what we regard as a member of the Rubiaceæ, are, next to the *Elæocarpus*, the most numerous in the collection. We have not been able to determine the genus.

[1] Narr. Chall. Exp., vol. i. p. 566, *et passim*, 1885.

Myristica sp.

The nutmegs are all probably of one species, and the pericarp has quite disappeared in all cases, yet the seeds appear to be sound.

Laurineæ.

There are two different exalbuminous seeds, with large hemispherical cotyledons, which probably belong to this order.

Phyllanthus sp. ?

A single fruit.

Clinogyne grandis, Benth. et Hook. f.

One fruit of this scitamineous plant, which is common in the region.

Gnetum spp.

There are several fruits of two distinct species of this genus, neither of which we can match. They are both large fruits, and oblong in shape, the larger being one inch and a quarter long in its present condition, and two inches and a half in circumference. The albumen of these seeds is exceedingly hard, and cuts like resin.

There are two fruits of another genus, the affinities of which we have failed to discover.

Other records of various fruits being found in the crops of pigeons are:—

Baron Mueller (Vegetation of the Chatham Islands, p. 14) states that a large pigeon finds plentiful food on the fruit of the Karaka tree (*Corynocarpus lævigata*, Forst.), a common tree in New Zealand, especially near the sea; but found nowhere else except in the Chatham Islands, where, however, it is said to form the largest part of the forest. And Wallace (Malay Archipelago, ii. p. 61) mentions that the fleshy outer covering of the Kanari (*Canarium commune*) is the favourite food of the great green pigeons (*Carpophaga perspicillata*) of Batchian. This tree is widely dispersed in Tropical Asia, but it is cultivated only in some parts. In the Journal and Proceedings of the Royal Society of New South Wales, xvii. p. 226, Dr Guppy records finding fruits of an *Elæocarpus* and a palm, probably a species of *Kentia*, in the crops of pigeons shot on a small island off the coast of San Christoval, Solomon Islands. In the Kew Museum are fruits of *Oncocarpus vitiensis*, A. Gr., from the gizzard and crop of *Carpophaga latrans* in the Fijis, presented by Professor Garrod; the fruit of *Gnetum gnemon?* from the crop of a fruit pigeon in New Guinea, and a species of *Ficus* from the same source, in Mysore, presented by W. A. Forbes, Esq.

ON THE

VEGETABLE DRIFT, AND ON THE DISPERSAL OF FRUITS AND SEEDS IN THE ISLANDS OF BOUGAINVILLE STRAITS, IN THE SOLOMON GROUP.

Compiled from the Notes and Collections made by H. B. GUPPY, M.B., F.G.S., during 1883 and 1884, while Serving on Board H.M.S. "Lark."

Just as we were on the point of finishing the examination of the collections of drift seeds, &c., made by Mr Moseley and others, Dr H. B. Guppy, R.N., arrived in England from the Solomon Islands, bringing with him considerable botanical collections, which he has presented to Kew. Among other things is a quantity of drift seeds and seed-vessels, and also others taken from the crops of carpophagous birds, shot by Lieutenant T. H. Heming and Lieutenant A. Leeper of H.M.S. "Lark." As this collection affords additional evidence of the influence of oceanic currents and birds in the dissemination of plants, a brief review of it follows, together with Dr Guppy's observations made on the spot, which he kindly communicated, with his permission and wish that any information they contained might be embodied in this Report. The names of the plants are substituted for the numbers cited by Dr Guppy, and two or three other slight alterations have been made. A list of the seeds and seed-vessels identified follows :—

Vegetable Drift.—Lines of vegetable drift, intermingled with floating pumice, are frequently observable whilst cruising among the islands of the Solomon group. Amongst the floating fruits, those of *Barringtonia speciosa* and *Calophyllum inophyllum* are commonly found; and on more than one occasion, solitary fruits of the former were noticed at sea at a distance of 130 to 150 miles to the southward of the group, being probably derived from one of the islands of the New Hebrides to the eastward. Other fruits occurring frequently in the drift are those of *Nipa fruticans*, and of two or more species of *Pandanus;* numerous beans (species of *Mucuna, Canavalia, Dioclea*), the long germinated seeds of mangrove (*Rhizophora*), an occasional cocoa-nut, the cones of *Casuarina equisetifolia*, which is a common sea-shore tree, *Terminalia* spp., &c. On a small, bare, sandy islet or sand-key situated on a reef in Bougainville Straits, I observed thirty different kinds of seeds and fruits, which are only washed over the bank at spring tides. These belong to characteristic littoral plants, such as *Heritiera littoralis, Barringtonia speciosa, Pandanus* spp., *Calophyllum inophyllum, Nipa fruticans*, and *Cocos nucifera.*

The Trees of a Coral Islet.—In order to connect my notes on the dispersal of plants in this region, I will take the case of a small wooded islet, not more than a few hundred yards across, and formed on a coral reef from materials heaped up by the waves to a height of two or three feet above the usual high-tide level. On the weather margin of

such an islet, which may be termed its growing edge, the vegetation is scanty, and there are but few trees. A binding weed loosely covers a surface composed almost entirely of sand, broken shells, and coral debris with pumice; and it is on such an unproductive soil that the *Casuarina* and *Pandani* flourish. On the lee side of the islet, which is the nucleus or oldest portion, from which the islet has been gradually growing seaward with the extension of the reef, the soil contains a much larger proportion of humus, and the vegetation is not only much denser, but is of a different character. Here, the trees form a thick belt, their branches overhanging the rising tide. The commoner kinds are: *Barringtonia speciosa*, *Calophyllum inophyllum*, *Thespesia populnea*, *Hibiscus tiliaceus*, together with others, such as *Cerbera odollam* and *Ochrosia parviflora*. It is worthy of note that the fruits of nearly all the trees mentioned as forming the margin of the vegetation, whether on the lee or weather side of such an islet, float in salt water. The small cones of the *Casuarina* are, however, an exception, for they sink in salt water when they are green, and require a certain amount of drying before they can be transported by the tides and currents of the sea. Just within the line of trees that immediately borders the beach, *Cycas circinalis*, *Pandanus* spp., *Heritiera littoralis*, *Terminalia* sp., and *Cerbera odollam* commonly occur. With the exception of the fruits of the *Cycas* the fruits of all these trees float in salt water, and occur abundantly in the vegetable drift. Out of ten green fruits of the *Cycas*, all but one sank in salt water, yet this exceptional circumstance sufficiently accounts for its occurrence on the coral islets. On the whole, my observations prove that the waves afford the means of dispersal of all those trees in a coral islet which line the shore, as well as of those which form a belt immediately within them.

Proceeding further in from the beach towards the centre of the islet, huge banyans and other trees having wide-spreading buttresses are met with; many of which reach a height of 150 feet and upwards, and afford a home to numbers of fruit-eating pigeons, which largely subsist on their fruits. Conspicuous amongst these trees is a species of *Canarium*, the disgorged nuts of which frequently strew the ground beneath, a banyan (*Ficus* sp.), with large oblong fruits, and another species with spherical fruits, a species of *Eugenia*, probably a variety of *Eugenia jambos*, together with several others, the fruits of which were found in the crops of pigeons shot, and a list of which is given below. The Fruit Pigeon, therefore, is doubtless an active agent in the conveyance of seeds of such trees from island to island.

The picturesquely wooded coral islets of these seas have thus been stocked through two principal agencies. Winds and currents drift to their shores the fruits and seeds of the littoral trees which ultimately form a belt, whilst the fruit pigeons disgorge the seeds or fruits of those often colossal trees which occupy the interior. The same agencies co-operate in the dissemination of the plants inhabiting the larger islands, where the littoral trees are much the same. There are wide mangrove swamps on the coast, and lines of *Nipa* palms edging the lower courses of the streams. In addition to those already mentioned, I observed that the pigeons ate several others, including the fine laurel (*Litsea* sp.) dis-

covered by me. But of the mode of dispersal of the greater bulk of the trees and shrubs with which I became familiar in my excursions I can only conjecture. Many of them possess fruits that would probably attract the fruit pigeon, which is able to swallow fruits as large even as a hen's egg. It is noteworthy that, with the exception of one species of *Areca*, no palm fruits were found in the pigeons' crops; and the fruits of most of the palms collected sink both in fresh and salt water. Of three species of *Areca* experimented upon, the fruit of only one—the common betel-nut palm—floated. Among other fruits that were observed floating were *Gomphandra* sp., a second species of *Calophyllum*, a species of *Harpullia*, and some Scitamineæ, which constitute a conspicuous feature in the vegetation of the region.

ROUGH LIST OF THE DRIFT SEEDS AND SEED-VESSELS COLLECTED BY DR H. B. GUPPY.[1]

GUTTIFERÆ.
Calophyllum inophyllum.

STERCULIACEÆ.
Heritiera littoralis.

RHAMNACEÆ.
Smythea sp.

LEGUMINOSÆ.
Canavalia sp.
Mucuna gigantea.
Mucuna sp.
Dioclea reflexa?
Dioclea sp.?
Pongamia glabra.
Pterocarpus sp.
Ecastaphyllum?
Cynometra?
Cæsalpinia nuga.
Bauhinia sp.?
Acacia sp.?

COMBRETACEÆ.
Terminalia sp.
Lumnitzera coccinea.

RUBIACEÆ.
Guettarda speciosa.

BORAGINEÆ.
Cordia subcordata.

LAURINEÆ.
Hernandia sp.

EUPHORBIACEÆ.
Excæcaria indica.

AMARYLLIDEÆ.
Crinum asiaticum.

A comparison of the foregoing list with the preceding enumeration of Mr Moseley's drift seeds and seed-vessels shows that many are the same. Few of them call for special remarks. The *Smythea* is probably *Smythea pacifica*, Seem., concerning the distribution of which little is known. The large proportion of Leguminosæ is in accord with all previous experience. *Cordia subcordata* and *Crinum asiaticum* are interesting; the large spongy tuber-like seed of the latter seemed to be quite sound when cut.

The collection of seeds and seed-vessels taken from pigeons' crops shot in the Solomon Islands by Dr Guppy consists of a dozen species, to several of which, and some others, references are made in Dr Guppy's notes. We have been less successful with these than we were with Mr Moseley's, having failed to determine the genera of half of them; but

[1] About one third of the species collected have not yet been recognised.

they will doubtless be recognised when Dr Guppy's dried plants from the same islands are compared. There are two species of *Ficus*, a *Psychotria?* a *Eugenia*, a *Premna?* and an *Areca*.

CONCLUDING REMARKS ON THE DISPERSAL OF PLANTS BY OCEANIC CURRENTS AND BIRDS.

It is hoped that the foregoing collection of facts bearing upon the dissemination of plants by oceanic currents and birds will sufficiently interest and stimulate those persons who have opportunities for observing the effects of these agencies in various parts of the world to observe and record the results of their observations. There can be no question that a large number of trees, shrubs, and herbs, many of them not essentially littoral, have been transported to distant countries by the agency of the sea, and that the area of many plants thus conveyed from place to place is only limited by climate and the nature of the shore upon which their seeds may be cast. That birds are also great seed-carriers, and assist largely in local diffusion, is equally certain, but facts are wanting to establish their reputed influence in materially widening the areas of species. Darwin fully discusses[1] the probabilities and possibilities of the occasional transport of seeds long distances by birds in various ways. "Almost every year," he states, "one or two land-birds are blown across the whole Atlantic Ocean, from North America to the western shores of Ireland and England," and he points out the possibility of small seeds being by this means conveyed long distances in mud sticking to the claws or other parts of the bird. He expresses the opinion that even if the occurrence be very rare, birds do convey seeds to vast distances, especially those of water and marsh plants. In nine grains of earth taken from the leg of a woodcock was a seed of a common rush (*Juncus bufonius*), which on trial germinated; while from the seeds contained in a ball of earth taken from the leg of a wounded partridge, no fewer than eighty-two plants, belonging to five species, were raised. In order to ascertain the probabilities of seeds being contained in the mud on the edge of a pond, three table-spoonfuls were taken from different points. "This mud weighed when dry only $6\frac{3}{4}$ ounces; I kept it covered up in my study for six months, pulling up and counting each plant as it grew. The plants were of many kinds, and were altogether 537 in number; and yet the viscid mud was all contained in a breakfast cup!"

In relation to the dispersion of plants by birds and oceanic currents Dr Beccari's[2] observations on the flora of the Arrou Islands have a special interest. He says he had no great hopes of discovering zoological novelties, but he was not prepared for the meagre flora that he found. Four months' continuous exploration yielded only between three and four hundred species of plants. Such poverty, he adds, I could not have imagined.

[1] Origin of Species, ed. i., pp. 363 and 386.

[2] Nuovo Giornale Botanico Italiano, v., 1873, p. 330.

The flora of the Arrou Islands is absolutely Papuan, and although so poor, it possesses a certain interest, because the means by which the islands were supplied with plants are evident. A large proportion of the species have fleshy fruits, which are eaten by birds, especially pigeons, which have perhaps contributed more than any other animals to the diffusion of plants. And it is noteworthy that the majority of the birds of Arrou are carpophagous. Cassowaries, too, are active agents in dissemination, for they swallow every kind of pulpy fruit, and with the swiftness of a horse convey them long distances undigested; they are also excellent swimmers, and traverse considerable expanses of water. The plants growing near the sea are spread throughout the Malayan Archipelago and New Guinea, and the fruits of nearly all are spongy or corky, and float from place to place on the surface of the water, and are cast ashore all round the coast. Some of the plants growing in the interior also have fruits of this nature, and are thus easily transported. Among plants whose seeds may be conveyed by winds only Asclepiadeæ were observed.

Setting aside the possibilities of seeds being occasionally conveyed long distances by birds at one stage, there remains the probability of a species being disseminated by birds, not necessarily of the same kind, by degrees, and in various directions. Of the kinds of seeds that might be conveyed by the sea and birds, in various ways, there seems almost no limit. The evidence afforded by the available data is far too incomplete for any generalisation; but members of the most different natural orders occur in oceanic floras, which, perhaps, more than any others, owe their existence to the agencies in question. Whether the present distribution of *Phylica nitida* (see Part II., p. 148) was brought about by the agency of birds is highly problematical. The distribution of the genus, like that of many others of the African region, points rather to a former greater land-connection. Dr H. B. Guppy, however, hazards the suggestion (Nature, xxvi. p. 12) that seeds might be transported from South Trinidad to Amsterdam Island, a distance of between 5000 and 6000 miles! One thing specially noticeable of the majority of the plants, concerning which we have certain evidence that their present areas are in part, at least, due to oceanic currents, is, that they have either exalbuminous seeds, or, if albuminous, the albumen is oily; yet Darwin proved that the seeds of various Gramineæ which have farinaceous albumen, will bear two or three months' immersion in sea-water without losing their germinative power. Another point to be considered is, whether very many of the common plants which are littoral throughout a great part of their present areas, are essentially littoral, or only accidentally so, in consequence of their seeds being conveyed uninjured to distant shores, where they are able to thrive. Some of them also occur inland, at remote distances from the sea, in localities where there is a minimum of salt in the soil, while others flourish wherever they are planted. An examination and fuller discussion of various agencies in plant dispersal will be found in our general Introduction.

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PLATE LIV.

PLATE LIV.

A small leaf and portion of the inflorescence of *Gunnera bracteata*, natural size.

Figure 1.—A flower with its subtending bracts.

,, 2.—The same divested of its bracts.

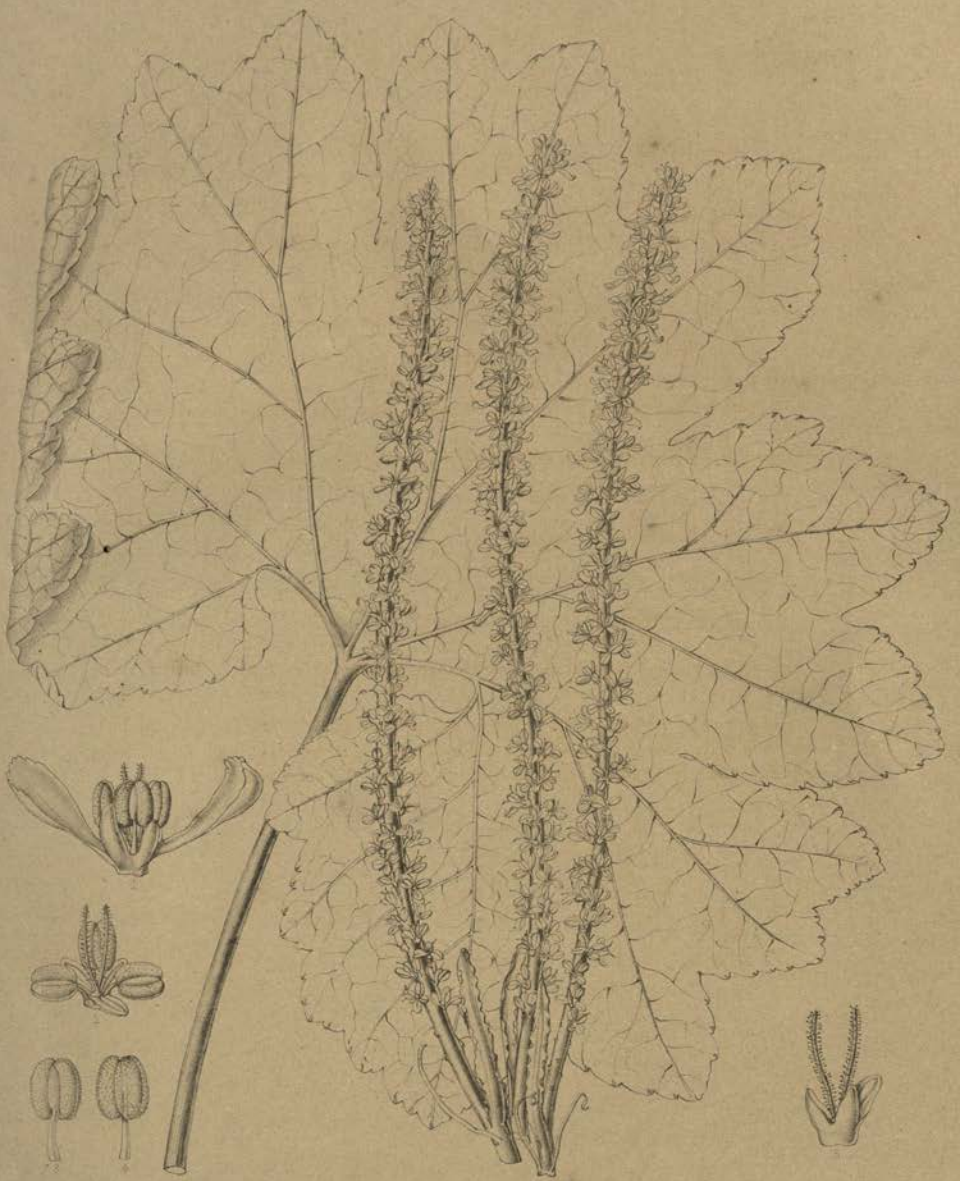
,, 3.—Back view of a stamen.

,, 4.—Front view of the same.

,, 5.—A pistillate flower : all the figures enlarged.

Drawn from a specimen in the Kew Herbarium collected in Juan Fernandez by Dr Bertero.

The flowers of the small portion of the inflorescence constituting Bertero's specimen seem to be polygamous, but no ovules could be found in the ovaries even of those without stamens. Philippi found that the spikes of this species were androgynous.



GUNNERA BRACTEATA, *Steud.*

PLATE LV.

PLATE LV.

A branch of *Robinsonia gracilis*, natural size.

Figure 1.—A flower-head.

„ 2.—Receptacle and portion of the involucre.

„ 3.—A bract of the involucre.

„ 4.—Portion of the receptacle, much more enlarged.

„ 5.—A ray-flower.

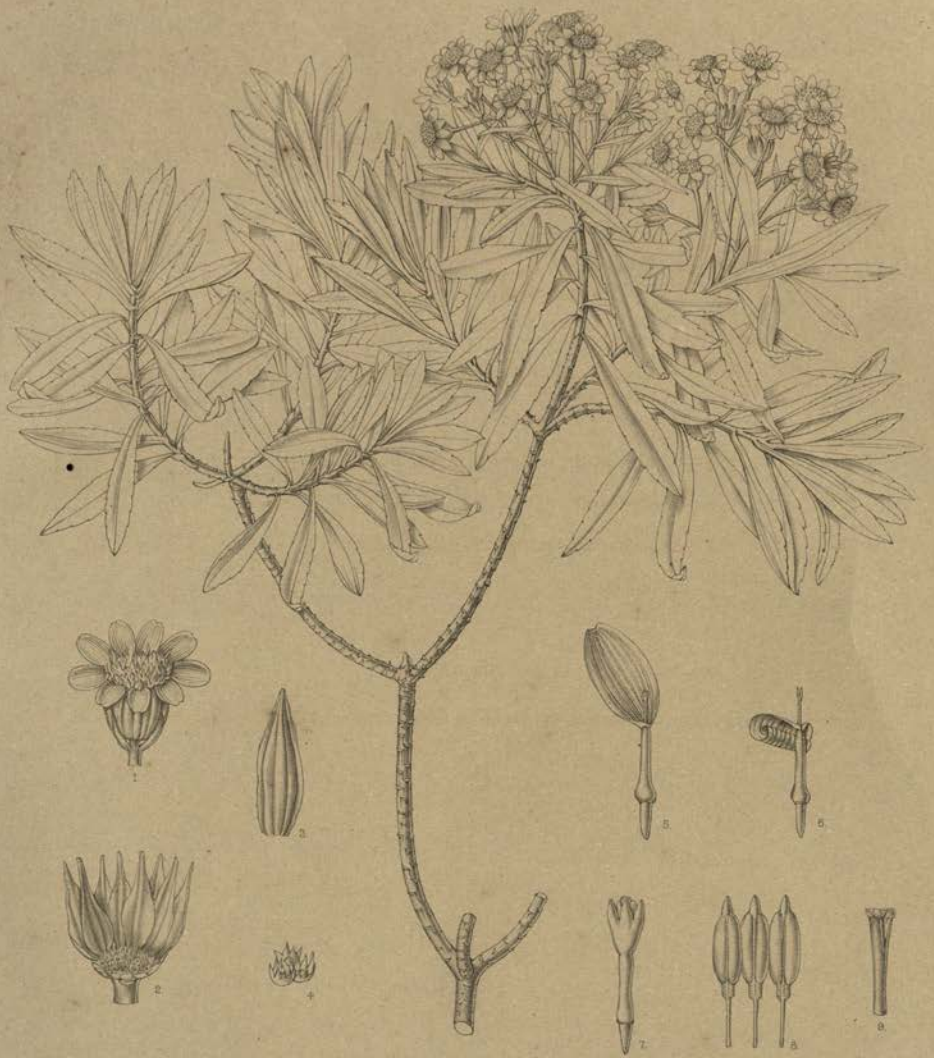
„ 6.—The same at a later stage; apparently sterile.

„ 7.—A disk-flower.

„ 8.—Stamens.

„ 9.—Style, with stigma: all enlarged.

Drawn from a specimen in the Kew Herbarium, collected in Juan Fernandez by Dr Bertero.



M. Smith del. W. Gibbs lith. M'Lagan & Cumming imp.

ROBINSONIA GRACILIS, *Dene*

PLATE LVI.

PLATE LVI.

Wahlenbergia fernandeziana.

Figure 1.—A leaf.

„ 2.—A flower.

„ 3.—A stamen.

„ 4.—Pistil; all except figure 1 enlarged; the flower about twice natural size.

Wahlenbergia grahamæ.

„ 5.—Portion of a plant, natural size.

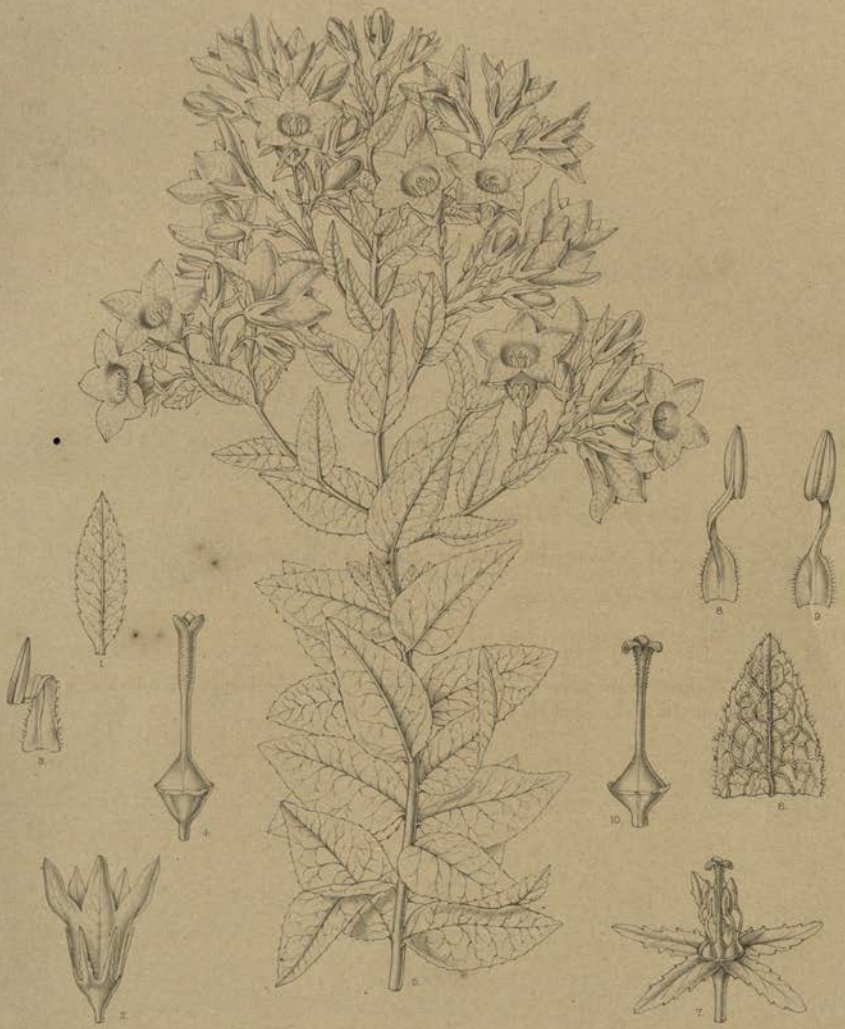
„ 6.—Portion of a leaf.

„ 7.—A flower from which the corolla has been removed.

Figures 8 and 9.—Stamens.

Figure 10.—Pistil; all enlarged.

Drawn from specimens in the Kew Herbarium from Juan Fernandez, collected by Mrs Graham, Dr Bertero, and Mr Moseley.



1-4 WAHLENBERGIA FERNANDEZIANA *A. D. C.*
5-10 WAHLENBERGIA GRAHAMI *Hemsl.*

PLATE LVII.

PLATE LVII.

A flowering branch of *Selkirkia berteroi*, natural size.

Figure 1.—Surface of leaf.

„ 2.—A flower.

„ 3.—Calyx and pistil.

„ 4.—Corolla, seen from below.

„ 5.—Corolla laid open, showing the insertion of the stamens.

„ 6.—Back view of an anther.

„ 7.—Front view of an anther.

„ 8.—Pistil.

„ 9.—Vertical section of the ovary, showing the position of the ovules during the flowering stage.

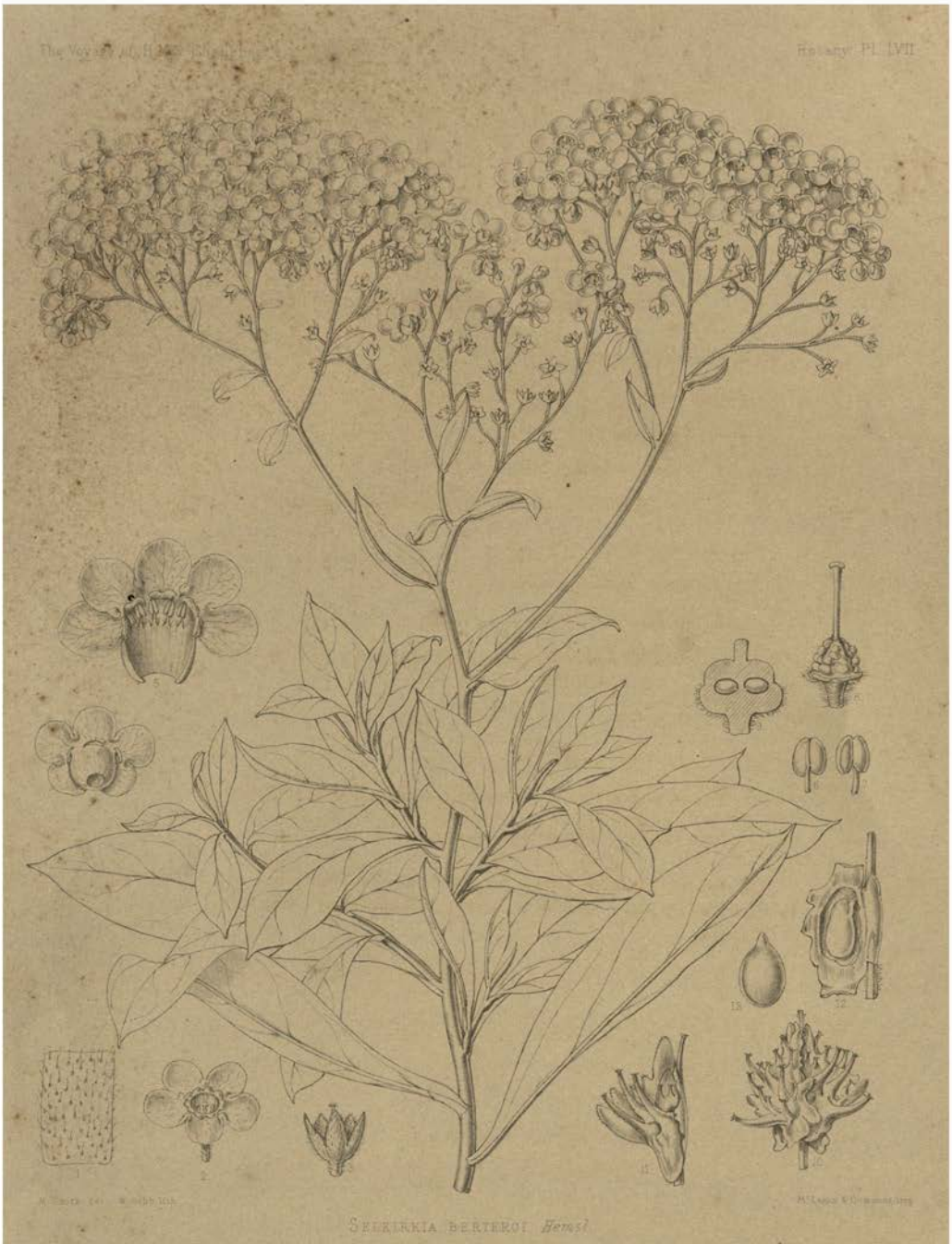
„ 10.—Ripe fruit.

„ 11.—A single nutlet.

„ 12.—A vertical section of the same, showing the position of the seed.

„ 13.—Embryo: the figures variously enlarged.

The drawing was made from specimens in the Kew Herbarium, collected in Juan Fernandez by Dr Bertero and Mr Reed; the fruit only being drawn from the specimens of the former.



SELKIRKIA BERTEROI *Hemsl*

PLATE LVIII.

PLATE LVIII.

A flowering branch of *Cuminia eriantha*, natural size.

Figure 1.—Corolla of a male flower laid open, showing the stamens.

„ 2.—Style from the same.

„ 3.—A female flower.

„ 4.—The same with the corolla removed, the cilia on calyx-lobes not shown.

„ 5.—Corolla of the same flower laid open, showing the abortive stamens.

„ 6.—Pistil of the same.

„ 7.—Ripe fruit in calyx.

„ 8.—The same with the calyx removed.

„ 9.—A single nutlet: all the figures enlarged.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, collected by Mr Moseley.

M. Smith del. W. Gibb, lith.

CUMINIA ERIANTHA *Benth.*

McLagan & Cumming imp.

PLATE LIX.

PLATE LIX.

A branch of *Lactoris fernandezia*, natural size.

Figure 1.—Inflorescence.

„ 2.—A flower having six fully developed stamens and three ovaries—apparently truly hermaphrodite.

Figure 3.—A flower having six fully developed stamens and rudimentary ovaries—apparently male in function.

Figure 4.—A flower having three fully developed ovaries and no stamens—apparently female.

Figure 5.—One of the ovaries laid open, showing the position of the ovules.

„ 6.—Front view of a stamen.

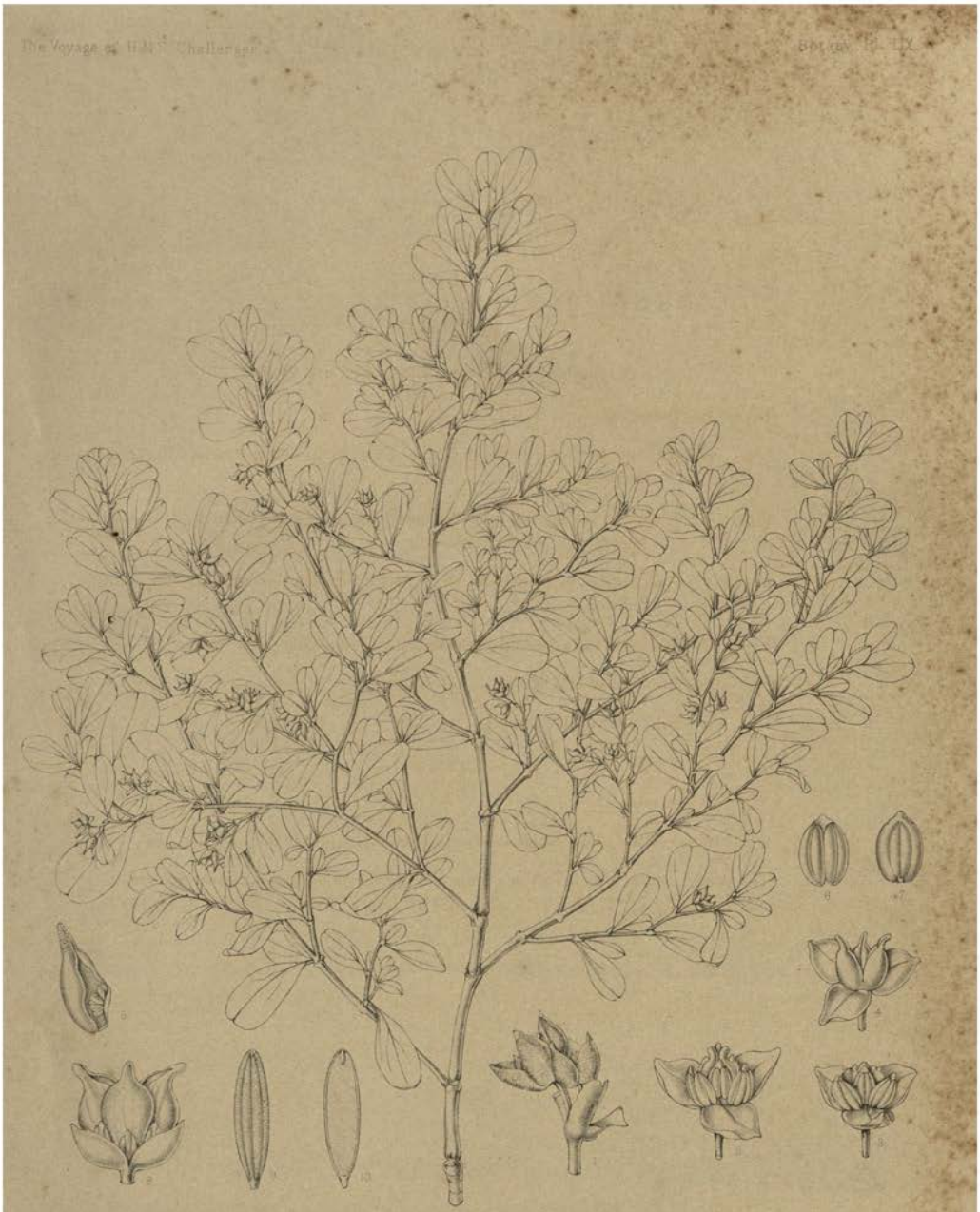
„ 7.—Back view of the same.

„ 8.—Ripe fruit.

„ 9.—A seed.

„ 10.—Section of the same, showing the embryo: all the figures enlarged.

The branch and figures 1–7 drawn from a specimen in the Kew Herbarium, collected in Juan Fernandez by Mr Moseley. Figures 8–10 from a specimen collected by Dr Bertero.



LACTORIS FERNANDEZIANA. *Phil.*

PLATE LX.

PLATE LX.

Portions of a plant of *Cladium scirpoideum*, natural size.

Figure 1.—A spikelet of the same.

„ 2.—Lowermost glume of spikelet, which is not shown on the spikelet.

„ 3.—Second glume from the base of a spikelet.

„ 4.—Pistil.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, collected by Mr Moseley.

Cladium ficticium.

Figure 5.—A spikelet.

Figures 6 and 7.—Lower glumes of the same: all the figures enlarged.

Drawn from a specimen in the Kew Herbarium, collected in Brazil by Mr Glaziou.

M. Smith del. W. Gibb lith.

1-4 CLADIUM SCIRPOIDEUM *Benth. et Hook. f.*

5-7 CLADIUM FICTICIUM *Hemsl.*

M. Logan & Cumming imp.

PLATE LXI.

PLATE LXI.

Portion of a plant of *Pantathera avenacea*, natural size.

Figure 1.—Portion of a leaf with ligule.

Figures 2 and 3.—The two outer empty glumes.

Figure 4.—Portion of the rhachilla bearing one floret.

„ 5.—Pale forked.

Figures 6 and 7.—Lodicules.

Figure 8.—Pistil with three styles.

„ 9.—Caryopsis enveloped in the pale.

„ 10.—Caryopsis : all the figures enlarged.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, collected by Mr Moseley.

PANTATHERA AVENACEA. *Philippi.*

PLATE LXII.

PLATE LXII.

Portion of a plant of *Podophorus bromoides*, natural size.

Figure 1.—Lower part of the blade and upper part of the sheath of a leaf with ligule.

,, 2.—A portion of the inflorescence.

Figures 3 and 4.—The two outer empty glumes.

Figure 5.—A floret and the elongated awn-like rhachilla.

,, 6.—The pale.

Figures 7 and 8.—The lodicules.

Figure 9.—The pistil : all enlarged.

Drawn from a specimen in the Kew Herbarium from Juan Fernandez, communicated by Dr Philippi.

POLOPHORUS BROMOIDES *Philippi*.

PLATE LXIII.

PLATE LXIII.

Polypodium (*Goniophlebium*) *translucens.*

Figure 1.—A portion of the rhizome and a frond of the ordinary form.

Figures 2 and 3.—Fronds of varieties of the same, figure 3 being bipinnatifid in the lower part.

Figure 4.—Portion of a pinnule, enlarged.

Figures 5 and 6.—Sporangia, much enlarged.

Figure 1 was drawn from a specimen in the Kew Herbarium, collected by Mr Moseley in Juan Fernandez; and figures 2 to 6 from specimens collected in the same island by Mr Downton.

M. Smith del. W. Gibb lith.

M. Ligen & Cumming imp.

POLYPODIUM (GONIOPHLEBIUM) TRANSLUCENS. *Kunze.*

PLATE LXIV.

PLATE LXIV.

Drifted and Stranded Fruits collected by Mr Moseley.

Figure A. 1.—Dorsal view of a carpel of *Chlænandra ovata?* from which the cellular tissue has been removed by the action of the sea: natural size.

„ 2.—Ventral view of the same.

„ B.—Fruit of *Vateria papuana:* natural size.

„ C. 3.—Seed of *Flindersia amboinensis?* natural size.

„ 4.—Fruit of the same.

„ D. 5.—Germinating seed of *Gnetum rumphianum.*

„ 6.—Another seed of the same, from which the outer envelope has been removed: natural size.

„ 7.—Cross section of the latter.

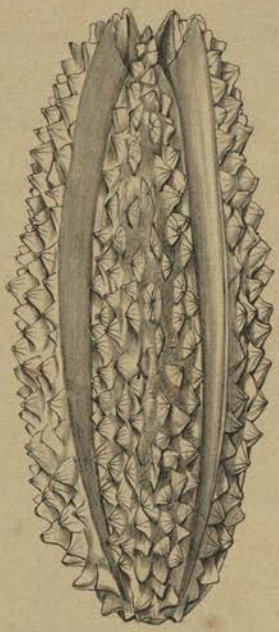
„ E. 8.—One carpel of the fruit of a species of *Brackenridgea:* enlarged.

„ 9.—The same: natural size.

„ 10.—Vertical section: enlarged.

„ 11.—Cross section: enlarged.

„ 12.—Embryo: enlarged.



M. Smith, del. W. Gibb, lith. Mc Lagan & Cumming, imp.

DRIFTED & STRANDED FRUITS.

PLATE LXV.

PLATE LXV.

Drifted and Stranded Fruits collected by Mr Moseley.

Figure F. 1 and 2.—Different views of the fruit of *Grevillea gibbosa*.

„ 3.—Seed of the same : natural size.

„ G. 4.—Fruit of *Grevillea* sp. ? [1] natural size.

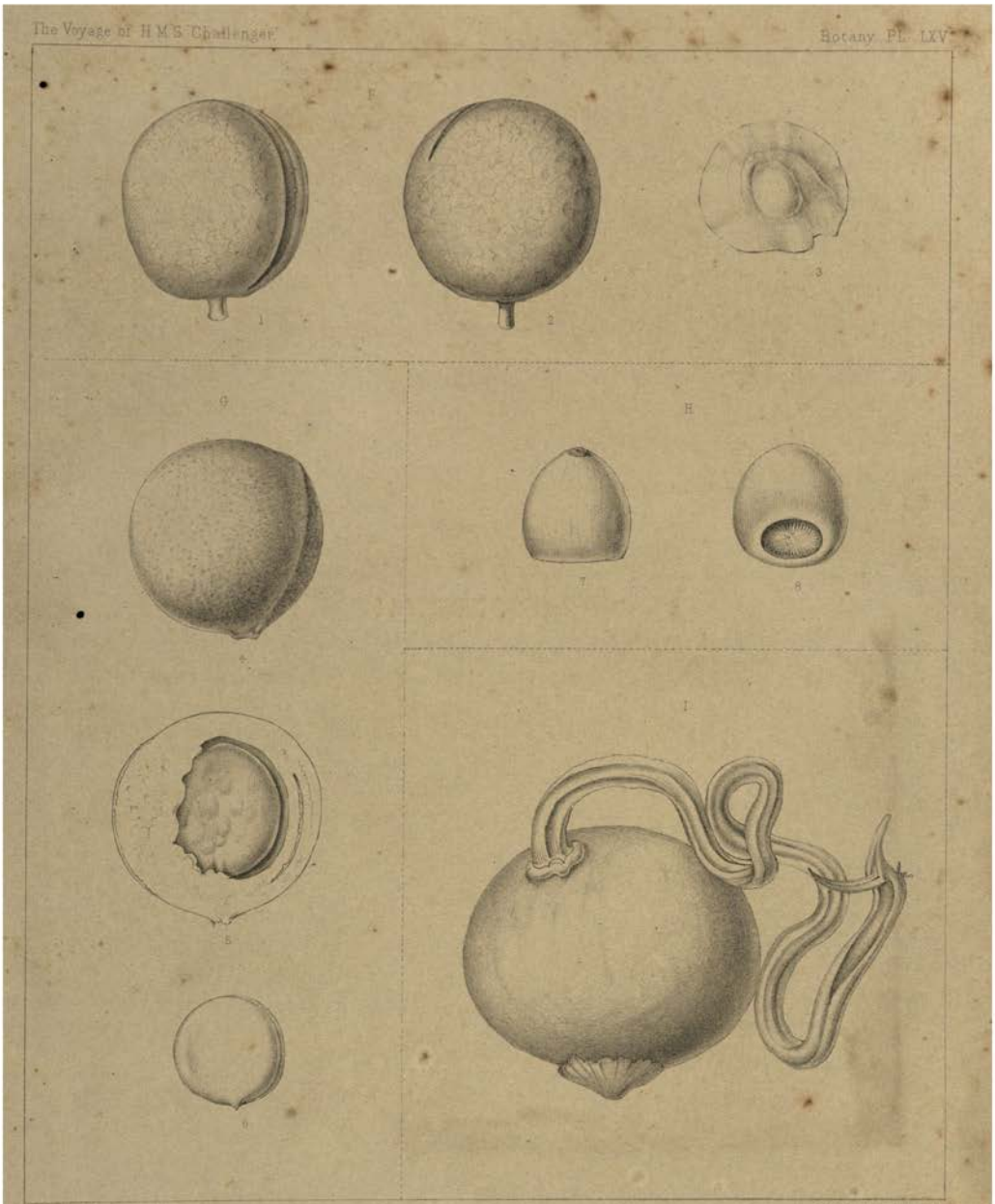
„ 5.—Vertical section of the same.

„ 6.—Seed.

„ H. 7 and 8.—Views of the acorns of a species of *Quercus :* natural size.

„ I.—Water-worn fruit of *Orania aruensis,* with germinating seed : natural size.

[1] Dr Beccari thinks this may be the fruit of a new genus of Proteaceæ, of which he collected foliage only. In the fruit sent to Dr Beccari there were two fully developed seeds.



M. Smith, del. W. Gibb, lith. McLagan & Cumming, imp.

DRIFTED & STRANDED FRUITS.

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